AD-A105 841 ERDMAN ANTHONY ASSOCIATES ROCHESTER NY F/G 13/13
NATIONAL DAM SAFETY PROGRAM. DAVIS BROOK DAM (SITE 1) (INVENTOR--ETC(U)
AUG 81 R J FARRELL DACW51-81-C-0017
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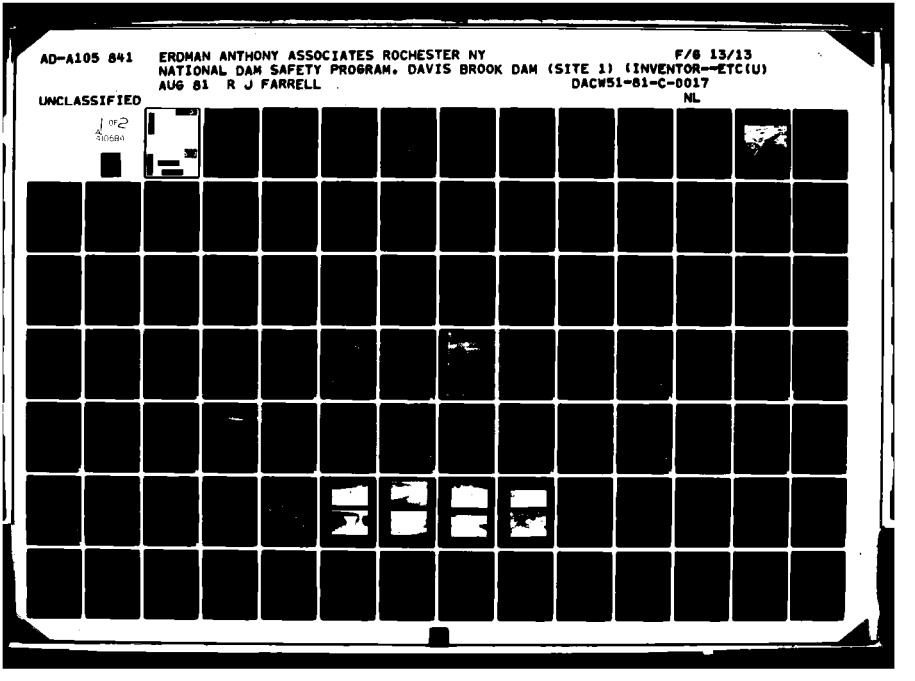

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19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

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Davis Brook Dam
Cattaraugus County
Allegheny River Basin

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This report provides information and analysis on the physical condition of the dam as of the report date. Information and analysis are based on visual inspection of the dam by the performing organization.

Examination of available documents and visual inspection of Conewango Creek Watershed Davis Brook Dam (Site 1) and appurtenant structures did not reveal conditions which constitute a hazard to human life or property. However, the dam has some deficiences which require further investigation and remedial action.

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A wet condition of unknown cause was observed on the lower portion of the left downstream slope. It is recommended that the services of a qualified registered professional engineer be retained to evaluate this condition.

Using the Corps of Engineers screening criteria for review of spillway adequacy, it has been determined that the dam would not be overtopped under full PMF conditions. The PMF routed through the reservoir required only 46 percent of the spillway outflow capacity. The spillway capacity is therefore judged as adequate.

The recommended investigation should be completed within 12 months of notification to owner, and remedial actions resulting from these investigations completed in the subsequent 12 months.

The following remedial measures should be performed within 1 year of notification to owner:

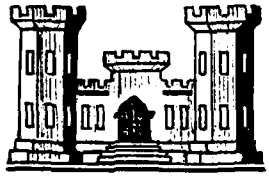
- Develop a formal downstream warning system.
- Develop and maintain a program of periodic technical inspections.
- Implement a program of diligent and periodic maintenance.
- Remove trees and brush from slopes.
- Regrade and fill in the erosion gullies.
- Install ladder rungs on the riser.

ALLEGHENY RIVER BASIN

CONEWANGO CREEK WATERSHED
DAVIS BROOK DAM (SITE 1)

CATTARAUGUS COUNTY, NEW YORK
INVENTORY No. N.Y. 564

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM



NEW YORK DISTRICT, CORPS OF ENGINEERS

AUGUST 1981

PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I Investigation; however, the Investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through frequent inspections can unsafe conditions be detected and only through continued care and maintenance can these conditions be prevented or corrected.

Phase I Inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the Spillway Test Flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. Because of the magnitude and rarity of such a storm event a finding that a spillway will not pass the Test Flood should not be interpreted as necessarily posing a highly inadequate condition. The Test Flood provides a measure of relative spillway capacity and serves as an aid in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

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PHASE I INSPECTION REPORT

NATIONAL DAM SAFETY PROGRAM

Name of Dam:	Conewango Creek Watershed Davis Brook Dam (Site 1)
State Located:	New York
County Located:	Cattaraugus
Stream:	Davis Brook
Basin:	Allegheny River
Date of Inspection:	April 3, 1981

ASSESSMENT

Examination of available documents and visual inspection of Conewango Creek Watershed Davis Brook Dam (Site 1) and appurtenant structures did not reveal conditions which constitute a hazard to human life or property. However, the dam has some deficiences which require further investigation and remedial action.

A wet condition of unknown cause was observed on the lower portion of the left downstream slope. It is recommended that the services of a qualified registered professional engineer be retained to evaluate this condition.

Using the Corps of Engineers screening criteria for review of spillway adequacy, it has been determined that the dam would not be overtopped under full PMF conditions. The PMF routed through the reservoir required only 46 percent of the spillway outflow capacity. The spillway capacity is therefore judged as adequate.

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- Implement a program of diligent and periodic maintenance,
- Remove trees and brush from slopes,
- Regrade and fill in the erosion gullies.
- Install ladder rungs on the riser.

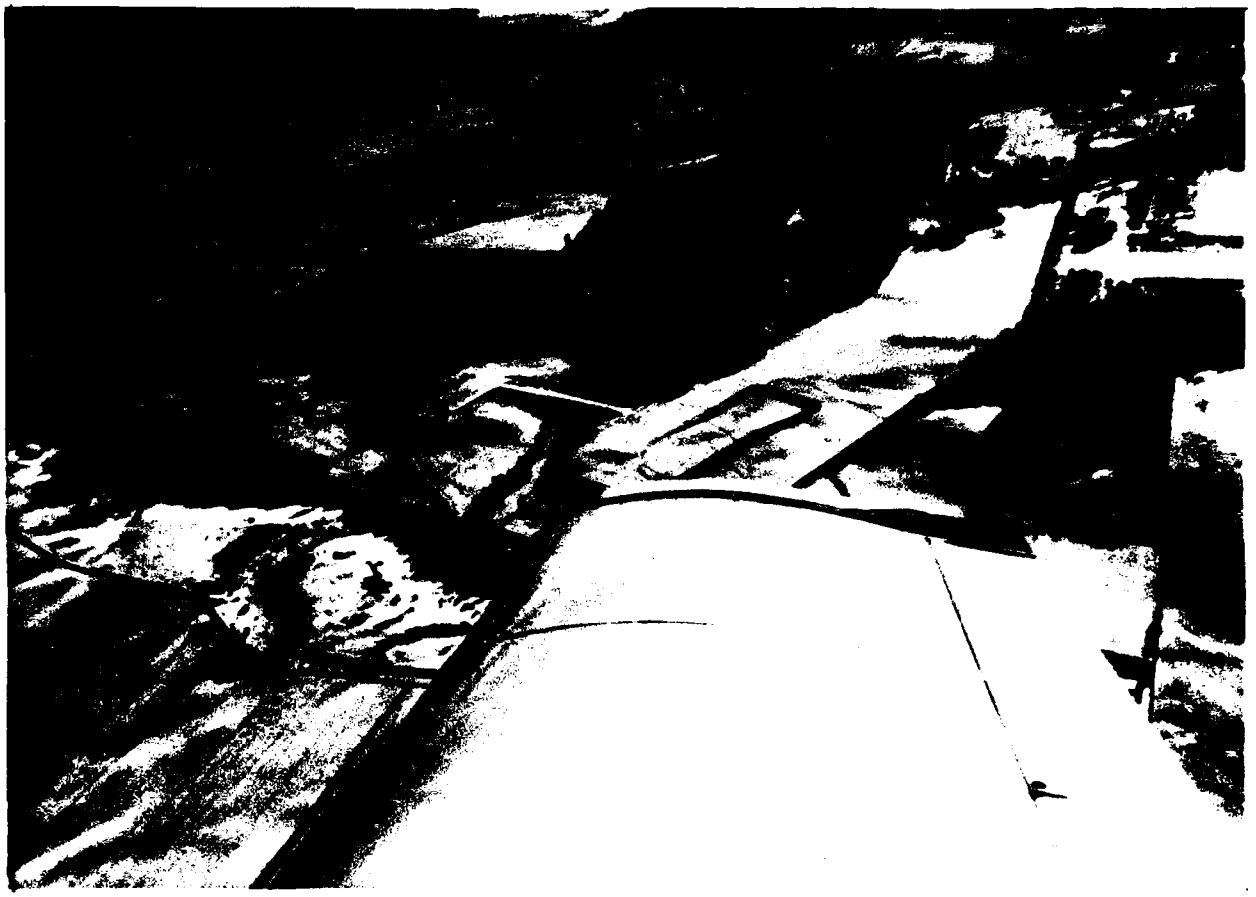
Robert J. Farrell, P.E.
New York No. 55983

Approved by:

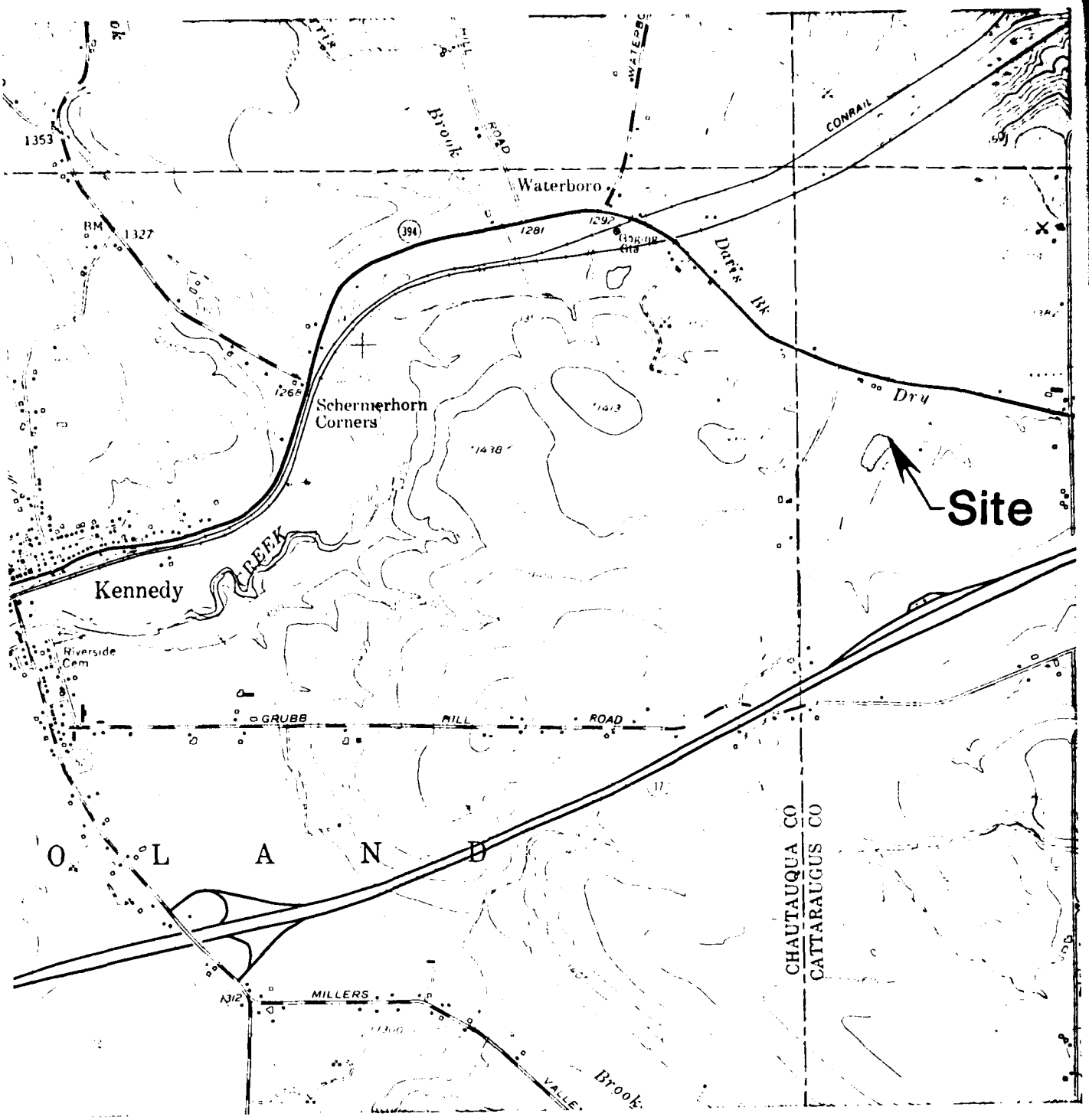
Col. W.M. Smith, Jr.
New York District Engineer

Date: 18 Aug 81

Davis Brook Dam
(Site 1)



AERIAL VIEW



Davis Brook Dam
(Site 1)

LOCATION PLAN

Scale: 1"=2000'

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

CONEWANGO CREEK WATERSHED
DAVIS BROOK DAM (SITE 1)

SECTION I - PROJECT INFORMATION

1.1 GENERAL

a. Authority

The Phase I inspection reported herein was authorized by the New York District Corps of Engineers in a letter dated 24 February 1981, in fulfillment of the requirements of the National Dam Inspection Act, Public Law 92-367, dated 8 August 1972.

b. Purpose of Inspection

This inspection was conducted to evaluate the existing conditions of the dam, to identify deficiencies and hazardous conditions, to determine if these deficiencies constitute hazards to life and property, and to recommend remedial measures where required.

1.2 DESCRIPTION OF THE PROJECT

a. Location

The Davis Brook Dam is located approximately one-quarter mile east of the Chautauqua-Cattaraugus County line and approximately 800 ft. south of New York Rte 394. It can be reached from both New York Rt. 394 and Grubb Hill Road. The dam is approximately 2.5 miles east of Kennedy, New York and shown on U.S.G.S. Kennedy, New York quadrangle with coordinates approximately at N42° 09.7, W79° 03.4 (see location plan). Page B-4 of Appendix B is a site plan for this dam.

b. Description of Dam and Appurtenances

The dam consists of a zoned earthfill embankment with an earthfill cutoff trench below; a principal spillway with a reinforced concrete riser structure and outlet pipe; and a vegetated earth channel emergency spillway located at the right abutment. The length of the dam embankment is approximately 565 ft. The overall length of the dam is approximately 794 ft. including the emergency spillway which has a weir length of 200 ft.

1) Dam Embankment

The embankment consists of a zoned compacted earth structure of gravelly or silty sand and clayey silty gravelly sand. It is founded on glacial till. It is a maximum of 48 ft. high.

The upstream slope is 3 horizontal to 1 vertical and the downstream slope is 2.5 horizontal to 1 vertical. The crest width is 16 ft.

Beneath the embankment is an earthfill cutoff trench of variable width at the bottom. According to available plans it is constructed of the same material as the embankment.

2) Emergency Spillway

The emergency spillway is cut into sand and gravel in the right abutment. A diversion berm of compacted fill has been constructed on the east side with side slopes of 3 horizonal to 1 vertical. The grass covered channel curves around the east end of the dam embankment

The control section is 200 ft. wide and 30 ft. long and the downstream channel is roughly 250 ft. long.

3) Principle Spillway

The principle spillway consists of a reinforced concrete drop inlet structure with a sluice gate controlled inlet pipe, two uncontrolled orifice inlets and a 30 in. outlet pipe supported on a concrete cradle.

The inside dimensions of the riser structure are 32.25 ft. high and 7.5 ft. wide normal to the axis of the dam. It is 2.5 ft. long parallel to the embankment and flares to 14.2 ft. long at the top. The walls of the structure are 15 in. thick for the bottom 6 ft., 12 in. thick for the next 5 ft., and 10 in. thick for the top section. The top slab is 8 in. thick. The structure is founded on a 14 ft. by 15.5 ft. spread footing.

The "low stage inlet" is an uncontrolled opening approximately 16.3 ft. above the sluice gate invert. It is 16 in. wide and 12 in. high and is located in the upstream face of the riser structure. The water flows over this orifice and drops into the riser structure. It is protected by a trash rack assembly approximately 5.5 ft. high and 4.2 ft. wide. This assembly is fabricated from galvanized steel angle sections.

The "high stage inlet" consists of two openings approximately 30 ft. above the sluice gate invert. They are 7.5 ft. wide and 15 in. high and are located in the left and right sides of the flared portion of the riser structure. They are protected by a galvanized steel grating 25 in. high placed in front of each high stage opening and 5 galvanized steel angles placed in the sloping section below each opening. A 30 in. diameter manhole permits access into the riser structure.

The riser structure is drained by a 30 in. diameter reinforced concrete pressure pipe. It is approximately 224 ft. long and drops approximately 4.2 ft. over that length. The pipe penetrates the downstream side of the riser structure and is supported by a 7.5 in. thick concrete cradle within the embankment. Plans indicate 6 concrete anti-seep collars cast around the pipe within the embankment.

The downstream end of the conduit and cradle extend approximately 8 ft. downstream of the embankment. The pipe and bedding is supported by a reinforced concrete bent. The discharge conduit outlets into a stone revetted plunge pool.

4) Foundation and Embankment Drainage

A vertical seepage drain with graded filter is located in the downstream foundation at a variable distance downstream of the centerline of the dam. It extends the full length of the embankment. The drain is approximately 4 ft. wide and variable depth. For approximately 100 ft. either side of the principal spillway the drain includes a system of 8 in. diameter pipe which outlets to the left and right of the outlet conduit.

5) Reservoir Drain

The reservoir drain consists of a reinforced concrete inlet with an invert elevation of 1323.0 ft. (MSL). The inlet is drained by 42.0 ft. of 12 in. diameter cast iron pipe resting on a 4 in. thick unreinforced concrete cradle. The pipe enters the upstream side of the riser structure with an invert elevation of 1321.4 ft. (MSL), 1.0 ft. above the riser floor. The drain is regulated inside the riser structure by a 12 in. diameter slide gate, and a stem and pipe sleeve which rise to the wrench socket flush with the top slab of the riser, where a T-wrench handle may be inserted.

c) Size Classification

The dam's maximum height of 48 ft. places it in the INTERMEDIATE size category according to the Corps of Engineers' Recommended Guidelines.

d) Hazard Potential Classification

The hazard potential classification for this dam is HIGH because of the significant economic and high potential for loss of life downstream in the event of dam failure. Section 5 of this report presents more detailed discussion of the hazard potential.

e) Ownership

The dam is owned by Richard L. Shields
P.O. Box 224
Kennedy, New York 14747
Tele: (716) 267-4801

f) Operator

The dam is operated by:

Conewango Creek Watershed Commission
Donald Crowell, Chairman
RD #2
S. Dayton, New York 14138
Tele: (716) 988-3300

g) Purpose of Dam

The purpose of this dam is to reduce downstream flooding by providing temporary storage for the runoff from 1030 acres. The temporary storage is released gradually through the two-stage principal spillway system.

h) Design and Construction History

The dam was built under the Watershed Protection and Flood Prevention Act by the Conewango Creek Watershed Commission with the assistance of the Soil Conservation Service. It was completed in 1964.

i) Normal Operating Procedure

The dam is normally self-regulating.

1.3 Pertinent Data

a) Drainage Area

The drainage area for this dam covers 1.6 square miles. It is made up primarily of hilly woodland and pasture.

b) Discharge at Dam Site

1) Outlet Works

Normal discharge at the site is through the 30 in. diameter outlet pipe. In the event of severe flooding water would flow over the emergency spillway at elevation 1356.8 ft. (MSL). The invert of the low stage orifice is at elevation 1337.7 ft (MSL). The invert of the high stage orifice is at elevation 1351.4 ft. (MSL).

2) Maximum Known Flood

There is no data available for the maximum known flood at this dam site. Recent high water was observed at elevation 1347.5 ft. (MSL).

3) Ungated Spillway Capacity at Top of Dam

The capacity of the principal spillway with the reservoir at top of dam elevation 1361.6 ft. (MSL) is 165 cfs. The capacity of the emergency spillway is 6835 cfs at this level.

4) Ungated Spillway Capacity at Test Flood

The capacity of the principal spillway with the reservoir at test flood elevation (1359.7 ft. MSL) is 151 cfs. The capacity of the emergency spillway is 3103 cfs at this level.

5) Gated Spillway Capacity at Normal Pool

There are no gated spillways.

6) Gated Spillway Capacity at Test Flood

As previously mentioned, there are no gated spillways.

7) Total Spillway Capacity at Test Flood

The total spillway capacity at test flood elevation (1359.7 ft. MSL) is 3254 cfs.

c. Elevation (ft. above NGVD)

1) Streambed at toe of dam: 1313.4
2) Bottom of cutoff: variable, approximately 1312 minimum
3) Maximum tailwater - unknown, outlet conduit invert 1316.2
4) Normal pool: 1337.7
5) Full flood control pool: 1356.8
6) Spillway crest - Pond Drain Invert: 1323.0
   Low level orifice: 1337.7
   High level orifice: 1351.4
   Emergency spillways: 1356.8
7) Design surcharge (original design): 1358.9
8) Top of dam: 1361.6
9) Test flood surcharge: 1359.7

d. Reservoir (Length in feet)

1) Length of maximum pool: 2100± ft.

2) Length of normal pool: 800± ft.

3) Length of flood control pool: 2000± ft.

e. Storage (acre-feet)

1) Normal pool: 23

2) Flood control pool: 175

3) Spillway crest pool:

a) Low stage inlet: 23
b) High stage inlet: 86
c) Emergency spillway: 175

4) Top of dam: 273
5) Test flood pool: 230

f. Reservoir Surface (acres)

1) Normal pool: 4

2) Flood control pool: 18

3) Spillway crest pool:

a) Low stage inlet: 4
b) High stage inlet: 14
c) Emergency spillway: 18

4) Test flood: 21

5) Top of dam: 23

g. Dam

1) Type: Earth Embankment
2) Length: 565
3) Height: 48 ft.
4) Top Width: 16 ft.
5) Side Slopes:

Upstream: 3H:1V
Downstream: 2.5H:1V

6) Zoning: Embankment of clayey, silty, gravelly sand with dual graded filter at downstream embankment seepage drain under full length of embankment

7) Impervious Core: Semi-pervious clayey silty gravelly sand

8) Cutoff: Variable width, earthfill
9) Grout Curtain: None

h. Diversion and Regulating Tunnel

Not applicable

i. Spillways

1. Type:

a)	Principal Spillway:	Reinforced concrete drop inlet
b)	Emergency Spillway:	Grass covered earth channel cut in right abutment

2. Length of Weir:

a)	Low Level Orifice:	16 inches
b)	High Level Orifice:	15 feet
c)	Emergency Spillway:	200 feet

3. Crest Elevation: (feet above NGVD)

a)	Low Level Orifice:	1337.7
b)	High Level Orifice:	1351.4
c)	Emergency Spillway:	1356.8

4. Gates: None

5. Upstream Channel: Davis Brook, narrow stream to reservoir through farm and woodland

6. Downstream Channel: Davis Brook, narrow stream through farm and woodland

j. Regulating Outlet:

None

SECTION 2 - ENGINEERING DATA

2.1 GEOLOGY

Bedrock at the dam site is upper Devonian Age (345-375 million years ago) known as the Canadaway Group. These relatively underformed and flat-lying sedimentary rocks consist of interbedded shales and siltstones. Regionally, the rock forms a homocline dipping southward to sowthwestward at approximately 40 feet per mile. Small terraces and low folds locally modify this dip to essentially flat-lying over short distances. Only minor folding and faulting are found in the region with no major or active faults known to exist in the area.

The Davis Brook Dam is in a region classified as Zone 2 seismicity, as shown in Figure No. 1 of the Recommended Guidelines for Safety Inspection of Dams.

Pleistocene glaciation (beginning approximately 2 million years ago) modified the topography by means of both erosion and desposition. The thick continental ice sheet, moving southward from Quebeck and Ontario, advanced and receded repeatedly in the area smoothing terrain by glacial scour and mantling the uplands with till deposits.

The Pleistocene geology of the dam site is that of glacial ground moraine. Generally alluvial gravels overlay dense sandy glacial till at the site. The till tends to be sparsely to moderately stony and very impermeable. In recent times, alluvium eroded from uplands has been deposited on these glacial deposits.

2.2 SUBSURFACE INVESTIGATION

Test hole logs are contianed in the "As-Built" drawings; however, the copies are illegible and are not included in Appendix B.

2.3 DESIGN RECORDS

The records available for the project conssits of 18 contract drawings which show the plans, sections and details for the dam, appurtenant structures, fencing details, and logs of test holes; and a design report issued by the U.S. Soil Conservation Service dated May 1969.

2.4 CONSTRUCTION RECORDS

Construction records and specifications are available at the U.S. Soil Conservation Service, Design Section, Syracuse, N.Y.

2.5 OPERATION RECORDS

No written maintenance or operation records exist for the dam.

2.6 EVALUATION OF DATA

Information obtained from the "As-Built" drawings is consistent with observations made during this inspection. The information obtained from available data was considered adequate for the Phase I inspection and evaluation.

SECTION 3 - VISUAL INSPECTION

3.1 Findings

a. General

The Davis Brook Dam is in GOOD condition at the present time.

b. Dam

1) Earth Embankment (See Photos 1, 5, 6, and 8)

The grass growth is heavy on this embankment impeding inspection of the slopes. Shrubs were noted along the right upstream abutment contact and to the right of the intake structure on the upstream slope.

Erosion gullies 1 to 2 in. wide and 1 in. deep were noted in in the right downstream abutment contact.

The crest of the dam is in good condition.

There is no slope protection on the upstream slope other than the vegetative cover. Approximately 6 to 8 in. of erosion due to wave action was noted at and above the water line on the upstream slope.

The toe drain under the downstream slope shows no flow emanating from its outlets. The downstream left slope is wet over the bottom 15 ft. This may be the result of seepage or natural groundwater from the abutment. No staining was observed.

Animal burrows were noted in the right upstream and downstream slopes.

2) Emergency Spillway (See Photos 6, 7, and 8)

This spillway is in good condition. Some wet areas were noted but they are the result of natural groundwater or ponded runoff. Some debris was noted in the channel and should be cleared.

c. Appurtenant Structures

1) Drop Inlet Service Spillway (See Photos 1 and 2)

The structure is in good condition with no evidence of spalling, cracking, or efflorescense. The trash racks are in good condition, and free from debris accumulation.

2) Pond Drain Inlet Pipe

At the time of inspection, the 12 in. pond drain inlet was completely submerged and could not be observed.

d) Reservoir Area (See photos 5 and 8)

The shore of the reservoir is generally shallow sloping pasture or woodland. It appears to be stable and in good condition.

e) Downstream Channel (See photo 4)

The downstream channel is a narrow channel passing over relatively flat flood plain. There is rip rap protection of the plunge pool. Some erosion of the right bank has taken place downstream of the plunge pool.

3.2 Evaluation

The dam is generally in good condition. The potential problems noted during the visual inspection are listed below.

a) The wet area noted over the bottom 15 ft. on the downstream left slope.

b) Drainage gullies along the right downstream abutment.

c) Animal burrows on the right upstream and downstream slopes.

d) Debris on upstream slope and in the emergency spillway channel.

e) Erosion of the downstream channel and the upstream slope of the dam at the waterline.

f) Brush growing on the upstream slope and the right abutment contact.

g) Operation of the drain gate could not be checked due to its inaccessibility.

SECTION 4 - OPERATION AND MAINTEANCE PROCEDURES

4.1 PROCEDURES

No written operation and maintenance procedures exist for the project. The normal operation of the project consists of allowing water to flow through the service spillway outlet pipe.

4.2 MAINTENANCE OF DAM

It is reported that maintenance of the dam is performed when the need arises. Maintenance is considered adequate.

4.3 WARNING SYSTEM IN EFFECT

No warning system is in effect or in preparation.

4.4 EVALUATION

The overall condition of the dam and appurtenant structures appears to be good. Recommendations in connection with regular maintenance are discussed in Section 7.

SECTION 5 - HYDRAULIC/HYDROLOGIC

5.1 Drainage Area Characteristics

Davis Brook Dam is located on Davis Brook, a tributary of Conewango Creek in the Allegheny River basin, and has a drainage area of 1.6 square miles. The dam is situated approximately 2.5 miles northwest of Kennedy New York. The topography of the watershed is hilly woodland and pastures.

5.2 Design Data

This dam was designed as a Class C structure in accordance with criteria established in Washington Engineering Memorandum SCS-27. Under this classification, the emergency spillway is designed for a rainfall equal to P(100) + 0.26 [PMP-P(100)] , while the freeboard pool is designed for the PMP rainfall.

The Soil Conservation Service (SCS) design calculations have been reviewed. The dam was designed to contain the runoff for the 100-year flood without discharging through the emergency spillway The peak outflow is 126 cfs and the peak elevation is 1356.8 ft. (MSL). The SCS design allowed for a 50-year sediment accumulation with a storage of 23.3 acre-ft. The principal spillway consists of 30 in. diameter reinforced concrete water pipe and a 2.5 ft. x 7.5 ft. reinforced concrete riser with two 7.5 ft. x 15 in. openings with a crest elevation of 1351.4 ft. (MSL). The riser has a 1.0 ft. x 1.3 ft. orifice with a crest elevation of 1337.7 ft (MSL). The emergency spillway control cross section is 200 ft. wide, with side slopes of 3 horizontal to 1 vertical and a crest elevation of 1356.8 ft. (MSL). The dam crest elevation is 1361.6 ft. (MSL).

5.3 Analysis Criteria

The analysis of the spillway capacity of the dam and the storage of the reservoir was performed using the Corps of Engineers HEC-1 Dam Safety Version computer model. The unit hydrograph was defined by the Snyder Synthetic Unit Hydrograph method, and the Modified Puls routing procedure was incorporated. The Probable Maximum Precipitation (PMP) was 22.8 in. (24 hours 200 sq. miles) from Hydrometerological Report #33 in accordance with the Recommended Guidelines of the Corps of Engineers. The dam is 48 ft. high and impounds approximately 273 acre-ft. at the top of the dam. The dam is classified as a HIGH hazard and INTERMEDIATE in size, according to the Recommended Guidelines of the Corps of Engineers. The spillway design flood is the Probable Maximum Flood (PMF). The floods selected for analysis were 20, 40, 50, 60, 80 and 100% of the PMF flows. The PMF inflow of 3261 cfs was routed through the reservoir and the peak outflow was determined to be 3254 cfs. The peak PMF outflow would produce a velocity of 7.0 ft./sec. on the emergency spillway and should not create an erosion problem.

5.4 Reservoir Capacity

The reservoir capacities at the crest of the emergency spillway and at the top of the dam are 175 acre-ft. and 273 acre-ft., respectively. Surcharge storage between the emergency spillway crest and the top of dam is equivalent to 1.1 in. of runoff from the drainage area.

5.5 Experience Data

There are no flood records for the dam site, however, during the field investgation, evidence of recent high water was observed at elevation 1347.5 ft. (MSL). This reservoir elevation corresponds to a peak outflow of 16 cfs.

5.6 Overtopping Potential

The maximum capacity of the spillways is 7000 cfs which is greater than the PMF peak outflow of 3254 cfs. The dam is not overtopped by the PMF, the peak elevation being 1.9 ft. below the top of the dam.

5.7 Analysis of Downstream Impacts

During the field investigation, dwellings and highways located downstream of the dam were identified and referenced to the channel invert. The cross section locations used in the downstream channel routing are shown on Page D-2, Appendix D. The impacts of the PMF on dwellings located downstream of the dam are shown in Table 5.1. For the purposes of this analysis, a danger of loss of life was assumed to exist if the computed PMF water surface was above the first floor elevation of a structrure. This situation does not occur at any of the structures and no roads are overtopped during the PMF. In spite of these results, the potential danger of loss of life and economic damage is substantial enough to warrant classification as a HIGH hazard dam.

5.8 Evaluation

The spillway of Davis Brook Dam will safely pass the PMF without overtopping, and is therefore assessed as "Adequate". Potential problems include:

a) The danger of loss of life and economic damage downstream of the dam for the test flood conditions.

TABLE 5.1

SUMMARY OF DOWNSTREAM IMPACTS FOR PMF

Location # (see page D-2 Appendix D)	Location	# of Dwellings	Structure Height above Streambed* (ft)	Peak Flow (cfs)	Peak Stage (ft)	Comments
1	1600' d/s of dam	1	14	3254	6	
2	1100' d/s Location #1	2	12	3251	8	
3	1600' d/s of Location #2	1 house 1 trailer	12.7 9.6	3246 3246	8 8	
4	500' d/s of Location #3	1 1	11.1 7.7	3246 3246	7 7	

*The structure height above the streambed is the difference between the first floor elevation and the channel invert.

SECTION 6 STRUCTURAL STABILITY

6.1 Visual Observations

There does not appear to be significant displacement or distress associated with the embankments at this site. The dam appears to be in good condition at the present time.

6.2 Design and Construction Data

Analyses carried out by the Soil Conservation Service during the design and construction phase included slope stability analyses by the infinite slope and Swedish circle methods. The soil parameters assumed for the final analysis were: Relative density 97%, $\phi = 31.5^{\circ}$ and c = 675 psf. Based on these assumptions, the factors for safety were higher than 2.5 for both upstream and downstream slopes. The dam is therefore considered to have adequate factors of safety for stability.

6.3 Post Construction Changes

There have been no known changes to any of the embankments or structures at this dam.

6.4 Seismic Stability

The dam is located in Seismic Zone No. 2 and, in accordance with the recommended Phase I guidelines, a seismic stability analysis is not warranted.

SECTION 7 - ASSESSMENT/RECOMMENDATIONS

7.1 ASSESSMENT

a. Safety

Examination of the available documents and visual inspections of the Conewango Creek Watershed Davis Brook Dam (Site 1) and appurtenant structures did not reveal any conditions which constitute a hazard to human life or property. The dam and its appurtenances are considered to be in good condition at the present time.

Using the Corps of Engineers screening criteria for review of spillway adequacy, it has been determined that the dam would not be overtopped for the spilway design flood of the full PMF nor for one-half the PMF. The principal and auxiliary spillway capacity are, therefore, judged as adequate.

b. Adequacy of Information

This report and its conclusions are based on visual inspection, interview data, contract drawings, and office hydrologic/hydraulic studies. This information and data are adequate for a Phase I inspection.

c. Need for Additional Investigations

It is recommended that the services of a qualified registered professional engineer be retained to evaluate the wet condition observed on the lower portion of the left downstream slope.

The engineer should make recommendations for remedial measure if warranted and the owner should implement the findings of these studies.

d. Urgency

The recommended investigation should be completed within 12 months of notification to owner and remedial actions resulting from these investigations completed in the subsequent 12 months. The remedial measures or actions listed below should be completed within one year from notification to owner.

7.2 RECOMMENDED MEASURES

It is recommended that the owner institute the following remedial measures:

1) Develop a formal written downstream warning system to alert the appropriate officials and residents in the event of an emergency.

2) Develop and maintain a program of periodic technical inspections.

3) Implement a program of diligent and periodic maintenance including but not limited to: mowing of slopes and spillway channels; backgilling ruts, drainage gullies, and animal burrows with suitable compacted material; clearing debris from trach racks and upstream slopes; and checking the operability of the drain gate.

4) Remove trees and brush from slopes including the roots. The resulting voids should be backfilled with suitable compacted material.

5) Regrade and fill in the erosion gullies on the downstream right slope and reseed the disturbed areas.

6) Install ladder rungs on the riser to provide access to the drain gate housing.

APPENDIX A

VISUAL INSPECTION CHECKLIST

VISUAL INSPECTION CHECKLIST

1) Basic Data

a. General

Name of Dam Davis Brook Dam

Fed. I.D. # NY 00564 DEC Dam No. 8B-3805

River Basin Allegheny

Location: Town Randolph County Cattaraugus

Stream Name Tributary of Davis Brook

Tributary of Conewango Creek

Latitude (N) 42° 09.7' Longitude (W) 79° 03.4'

Type of Dam Earth Embankment

Hazard Category High

Date(s) of Inspection April 3, 1981

Weather Conditions Sunny, 70°

Reservoir Level at Time of Inspection Approximately elevation 1338.2 ft.

b. Inspection Personnel Mr. James Reynolds, Mr. Jeff Hardin, Mr. Bob Farrell, Mr. Ken Avery

c. Persons Contacted (including Address & Phone No.)

U.S. Soil Conservation Service Rm 771-Federal Bldg., 100 So. Clinton St., Syracuse, NY

State Construction Eng: Philip "Skip" Nelson 1-315-423-5502

AREa 1 Proj. Engr. (Batavia): Pete Wright 1-716-343-3364

Contracting Ofc. (Conewango Creek Commission) Dick Shields 1-716-267-4801

d. History:

Date Constructed 1971 Date(s) Reconstructed

Designer U.S.D.A. Soil Conservation Service

Constructed by

Owner

Embankment

a. **Characteristics**

(1) **Embankment Material** Gravelly or silty sand (SM) to clayey silt, gravelly sand (SC-SM) and (SP)

(2) **Cutoff Type** Earthfill trench of variable bottom width

(3) **Impervious Core** None

(4) **Internal Drainage System** A dual graded filter makes up the downstream embankment, a 4 foot wide trench drain below the downstream embankment

(5) **Miscellaneous**

b. **Crest**

(1) **Vertical Alignment** Good

(2) **Horizontal Alignment** Good

(3) **Surface Cracks** None noted

(4) **Miscellaneous**

c. **Upstream Slope**

(1) **Slope (Estimate) (V:H)** 1 vertical to 3 horizontal

(2) **Undesirable Growth or Debris, Animal Burrows** Brush growth approximately 30 feet right of intake structure, minor amounts of debris

(3) **Sloughing, Subsidence or Depressions** None noted

(4) **Slope Protection** Vegetative cover and berm at water level 6 to 8 inches of wave erosion at or just above the present water level

(5) **Surface Cracks or Movement at Toe** None noted

d. **Downstream Slope**

(1) **Slope (Estimate - V:H)** 1 vertical to 2.5 horizontal

(2) **Undesirable Growth or Debris, Animal Burrows** Burrows 40 feet from right abutment 6 feet below crest (6" diameter), two more down slope

(3) **Sloughing, Subsidence, or Depressions** None noted

(4) **Surface Cracks or Movement at Toe** None noted

(5) **Seepage** Bottom 15 feet of left downstream slope is wet. This may be seepage or natural groundwater from the abutment, no flow could be discerned. No flow from toe drain outlets

(6) **External Drainage System (Ditches, Trenches, Blanket)** None noted

(7) **Condition Around Outlet Structure** Good

(8) **Seepage Beyond Toe** None noted

e. **Abutments - Embankment Contact**

A 6' x 6' slough has occurred approximately 12 feet below the crest at the left upstream contact. Heavy brush at right upstream contact

(1) **Erosion at Contact** None noted other than slough at left upstream contact

(2) **Seepage Along Contact** None noted other than seepage at left downstream slope discussed at 2-d-5

3) Drainage System

(a) Description of System 4 ft. wide trench drain containing a system of 8 in. diameter perforated pipe exiting on either side of the principal spillway outlet conduit

(b) Condition of System No flow was observed from the system

(c) Discharge from Drainage System None noted

4) Instrumentation (Momumentation/Surveys, Observation Wells, Weirs, Piczometers, etc.) None installed

5) Reservoir

a. Slopes Appear stable and in good condition

b. Sedimentation Very minor accumulation

c. Unusual Conditions Which Affect Dam None noted

6) Area Downstream of Dam

a. Downstream Hazard (No. of homes, highways, etc) Refer to Table 5.1

b. Seepage, unusual growth None noted

c. Evidence of movement beyond toe of Dam None noted

d. Conditions of Downstream Channel Small Slough on downstream right bank, approximately 20 ft. downstream of plunge pool

7) Spillway(s) (including Discharge Conveyance Channel)

a. General Good

b. Condition of Service Spillway Good, no evidence of cracking, spalling or efflorescence

c. Condition of Emergency Spillway Generally good; needs mowing and clearing of debris

d. Condition of Discharge Conveyance Channel Good

8) Reservoir Drain/Outlet

Type: Pipe X Conduit ____ Other ____

Material: Concrete ____ Metal ____ Other Cast Iron

Size: 12" I.D. Length 42' (from dwgs)

Invert Elevations: Entrance 252 ft. Exit 252 ft.

Physical Condition (Describe): Unobservable X

Material: ____

Joints: ____ Alignment ____

Structural Integrity: ____

Hydraulic Capability: ____

Means of Control: Gate ____ Valve X Uncontrolled ____

Operation: Operable ____ Inoperable X Other ____

Present Condition (Describe): Could not be operated due to missing handle.

9) Structural

a. Concrete Surfaces N/A

b. Structural Cracking N/A

c. Movement - Horizontal & Vertical Alignment (Settlement) N/A

d. Junctions with Abutments or Embankments N/A

e. Drains - Foundation, Joint, Face N/A

f. Water Passages, Conduits, Sluices N/A

g. Seepage or Leakage N/A

h. Joints - Construction, etc. N/A

i. Foundation N/A

j. Abutments N/A

k. Control Gates N/A

l. Approach & Outlet Channels N/A

m. Energy Dissipators (Plunge Pool,etc) N/A

n. Intake Structures N/A

o. Stability N/A

p. Miscellaneous N/A

10) Appurtenant Structures (Power House, Lock, Gatchouse, Other)

a. Description and Condition None

APPENDIX B

ENGINEERING DATA

APPENDIX B

CONEWANGO CREEK WATERSHE

FLOODWATER RETARDING DAM

SITE 1

DRAINAGE AREA 10

FLOOD STORAGE
(TO EMERGENCY SPILLWAY CREST

WATER SURFACE AREA
(SEDIMENT POOL

HEIGHT OF DAM

VOLUME OF FILL ~~54,5~~ 61,3

BUILT UNDER THE WATERSHED PROTECTIO
FLOOD PREVENTION ACT

BY

CONEWANGO CREEK WATERSHED COMM
WITH THE ASSISTANCE OF THE
SOIL CONSERVATION SERVICE
OF THE
U S DEPARTMENT OF AGRICULTURE

INDEX

ERSHED PROJECT
G DAM

1030 Acres
175 Ac Ft

4 Acres

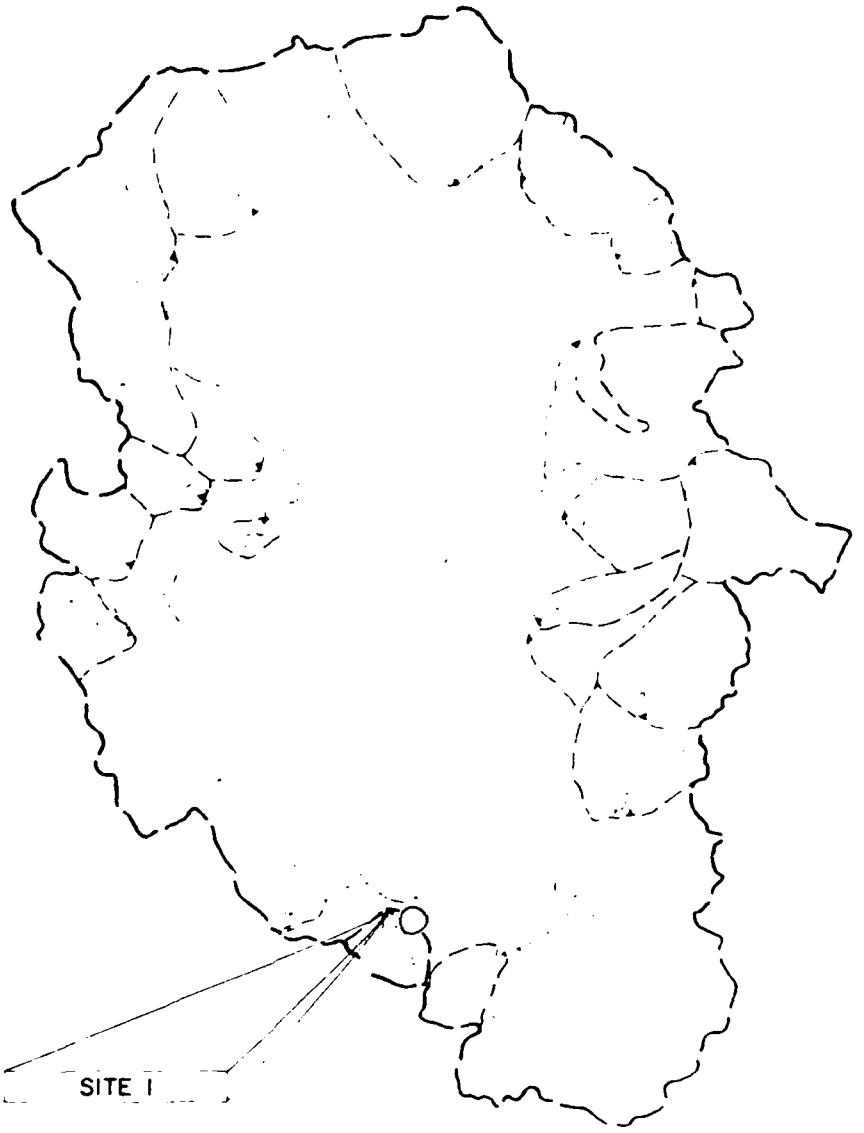
43 Feet
~~54,500~~ Cu Yds
61,361

ROTECTION AND
ACT

ED COMMISSION
F THE
VICE

ULTURE

MATION



AS BUILT

SITE 1
FLOODWATER RETARDING DAM
CATTARAUGUS COUNTY, NEW YORK

ZOGRAFOS
J.E. POLULECH 3/69

NY 215-P

B-2

CONSTRUCTION DETAILS

1. ALL AREAS FOR [illegible] AREAS AND BORROW INCLUDE THE FOLLOWING:

   a. BASE AREA OF DAM [illegible] FOOT EXTENSIONS NOT UPSTREAM AND DOWNSTREAM FROM TOES OF DAM. ALSO FOUNDATION EXCAVATION ON LEFT ABUTMENT AS SHOWN ON SHEET 2

   b. BASE AREA OF LEVEE

   c. THE ENTRANCE SPILLWAY INCLUDING 1 FOOT OUTSIDE OF SLOPES AND AREA EXTENDING THE FULL WIDTH OF SPILLWAY AT THE UPSTREAM SIDE DOWN TO EL. 1331.

   LIMITS OF AREA TO BE CLEARED AND GRUBBED SHALL BE STAKED IN THE FIELD BY THE ENGINEER.

2. DEPTHS AND LIMITS OF BORROW EXCAVATION SHALL BE DETERMINED IN THE FIELD BY THE ENGINEER AS REQUIRED. SLOPING OF THE BORROW AREA SHALL BE NO STEEPER THAN 4 HORIZONTAL TO 1 VERTICAL.

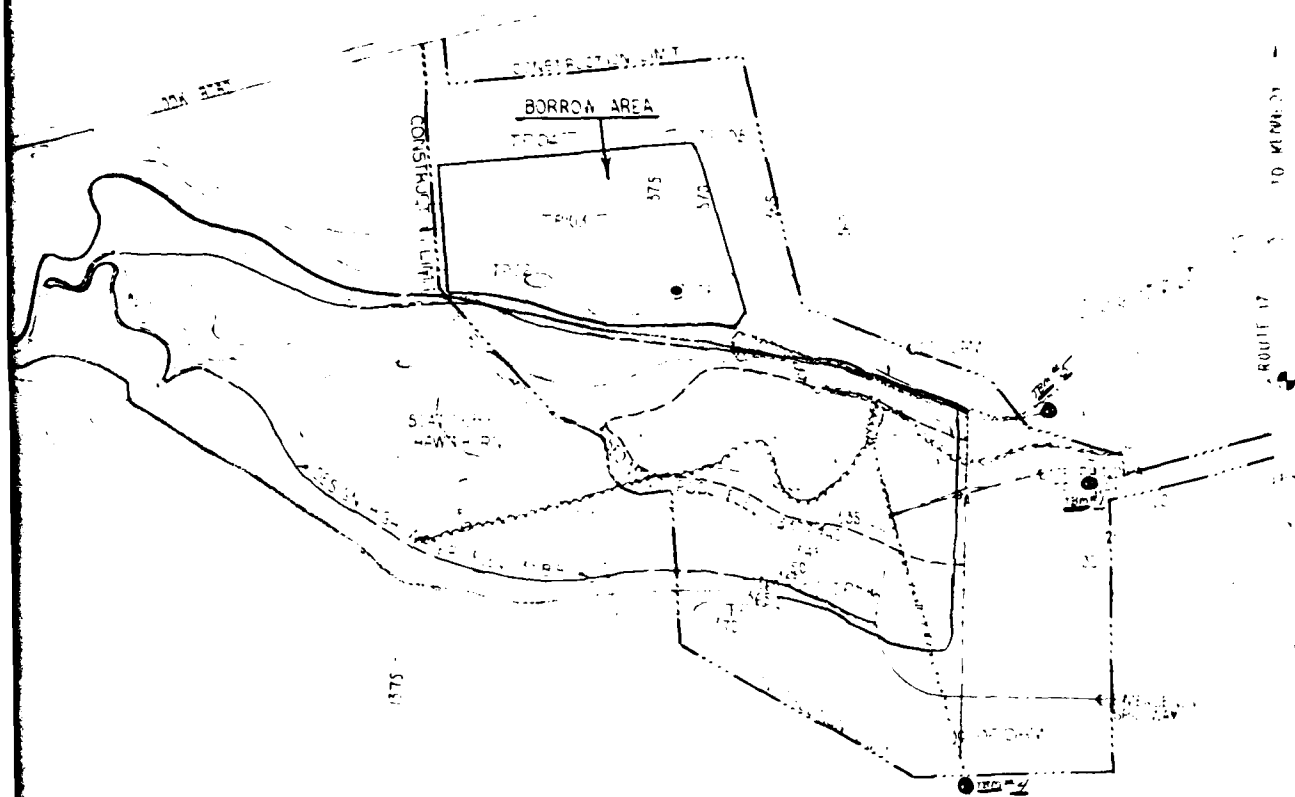
3. AREAS UPSTREAM FROM DAM AND BELOW ELEVATION 1334 SHALL BE CLEARED LIMITS OF AREA TO BE CLEARED SHALL BE STAKED IN THE FIELD BY THE ENGINEER.

4. [illegible] SECTION OF EMBANKMENT SPILLWAY TO BE LOCATED WITH TOP OF TOP SOIL FROM STA. [illegible] TO APPROX. STA. [illegible]

	ELEVS	
BM #3	1316.18	
TBM #1	1329.75	DISK-NAIL-CHERRY TREE ON CREEK BANK
TBM #4	1366.46	Disk & Nail - Cherry Tree Fence Line 12" Trunk Right Abutment
TBM #5	1350.35	Disk - Nail - Elm Tree Left Abutment - Downstream From ℄ Dam

AS BUILT

TO STEEL PIPE
INV. EL. 13679



AS BUILT

CONEWANGO CREEK WATERSHED
SITE 1

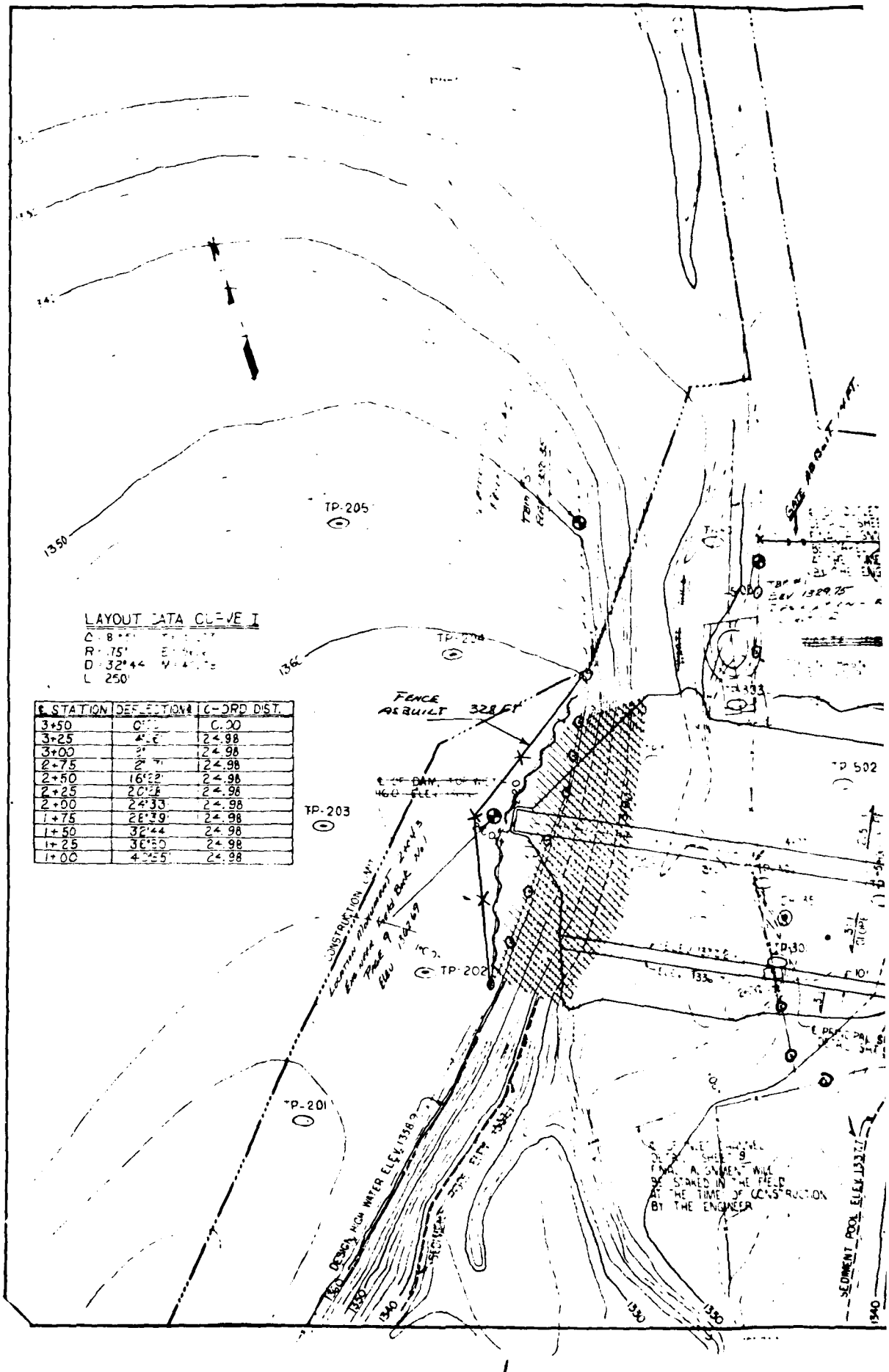
PLAN OF STORAGE AREA

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

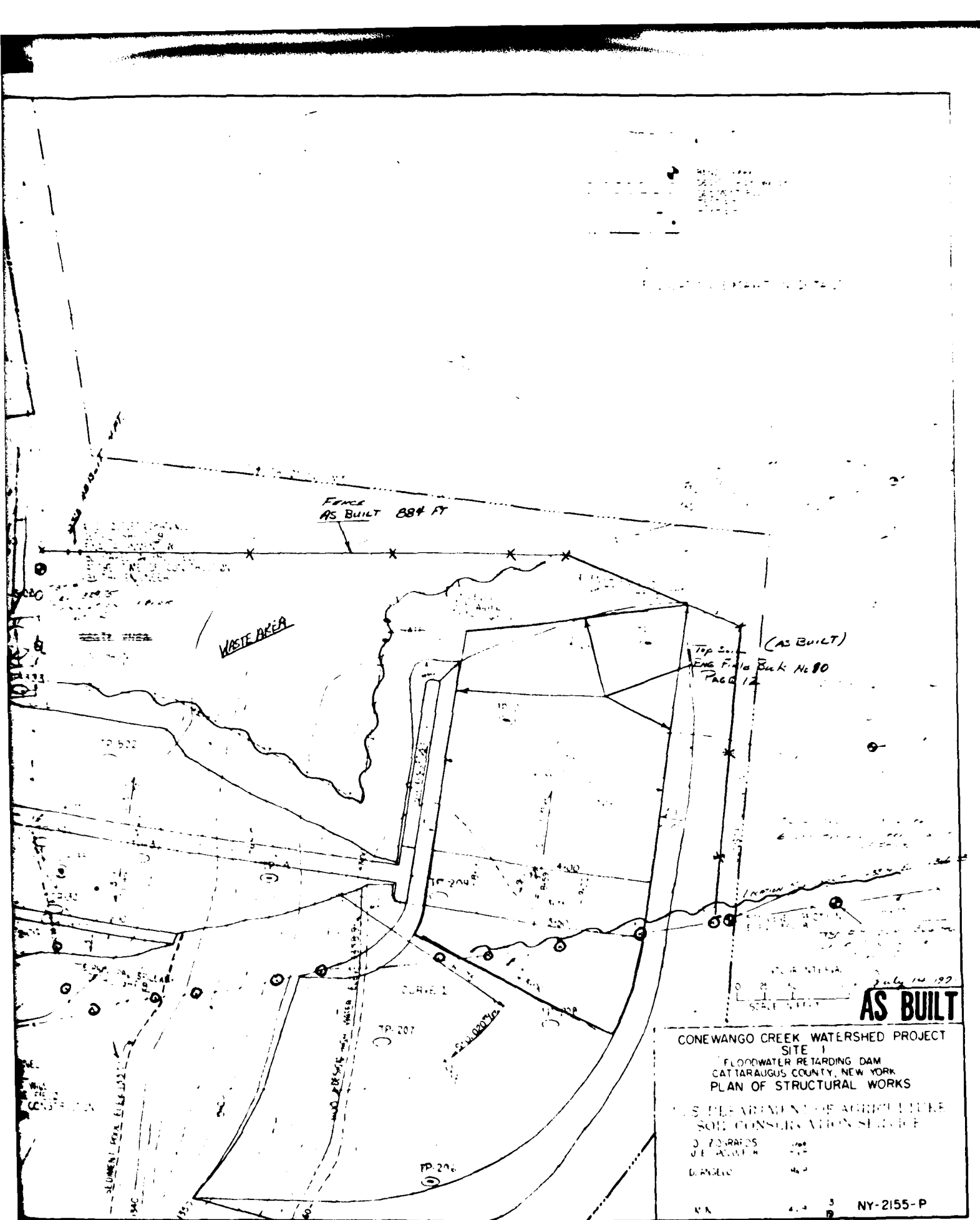
J. E. POLUJECH 8/68

NY-215-P

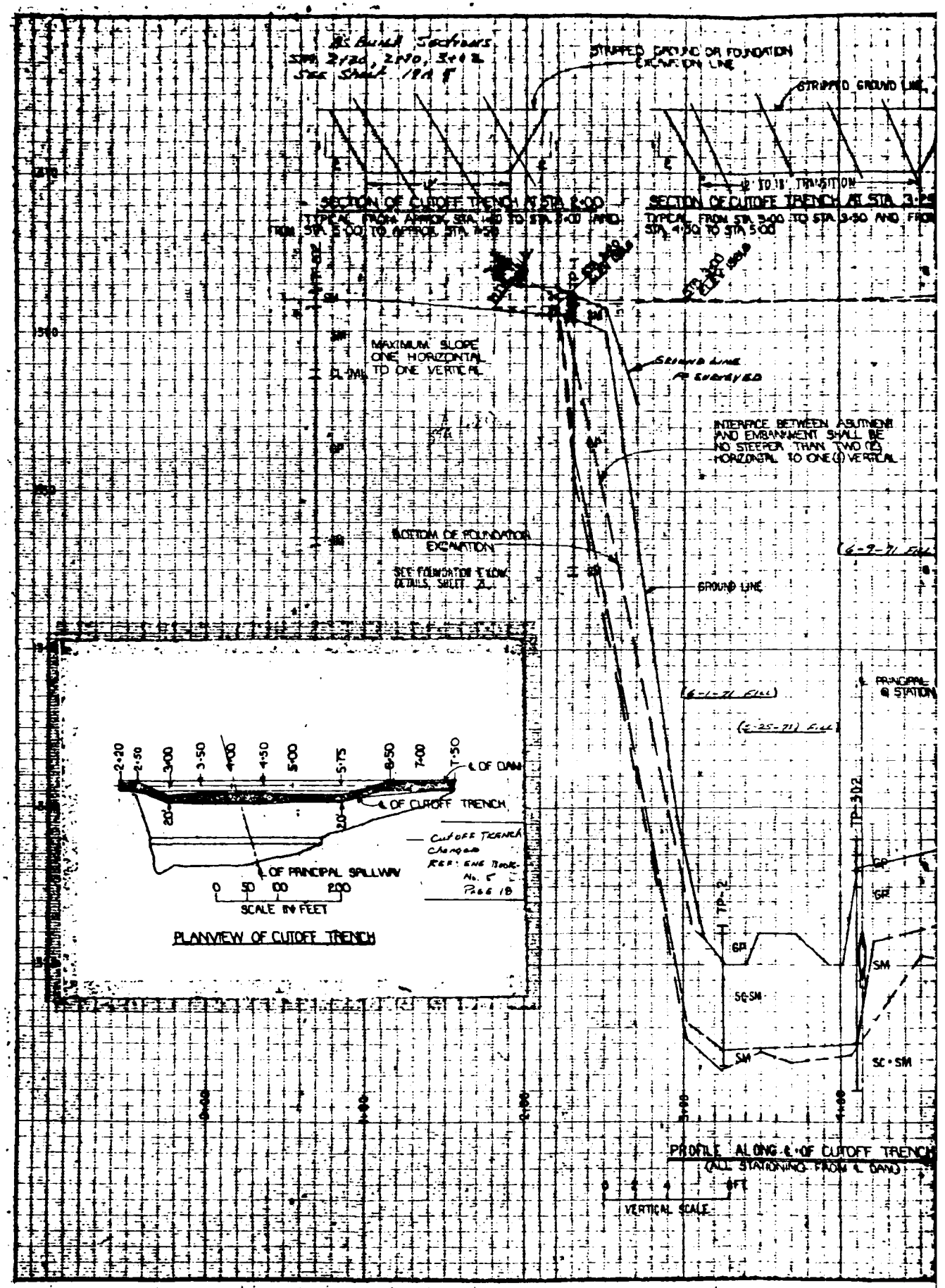
B-3

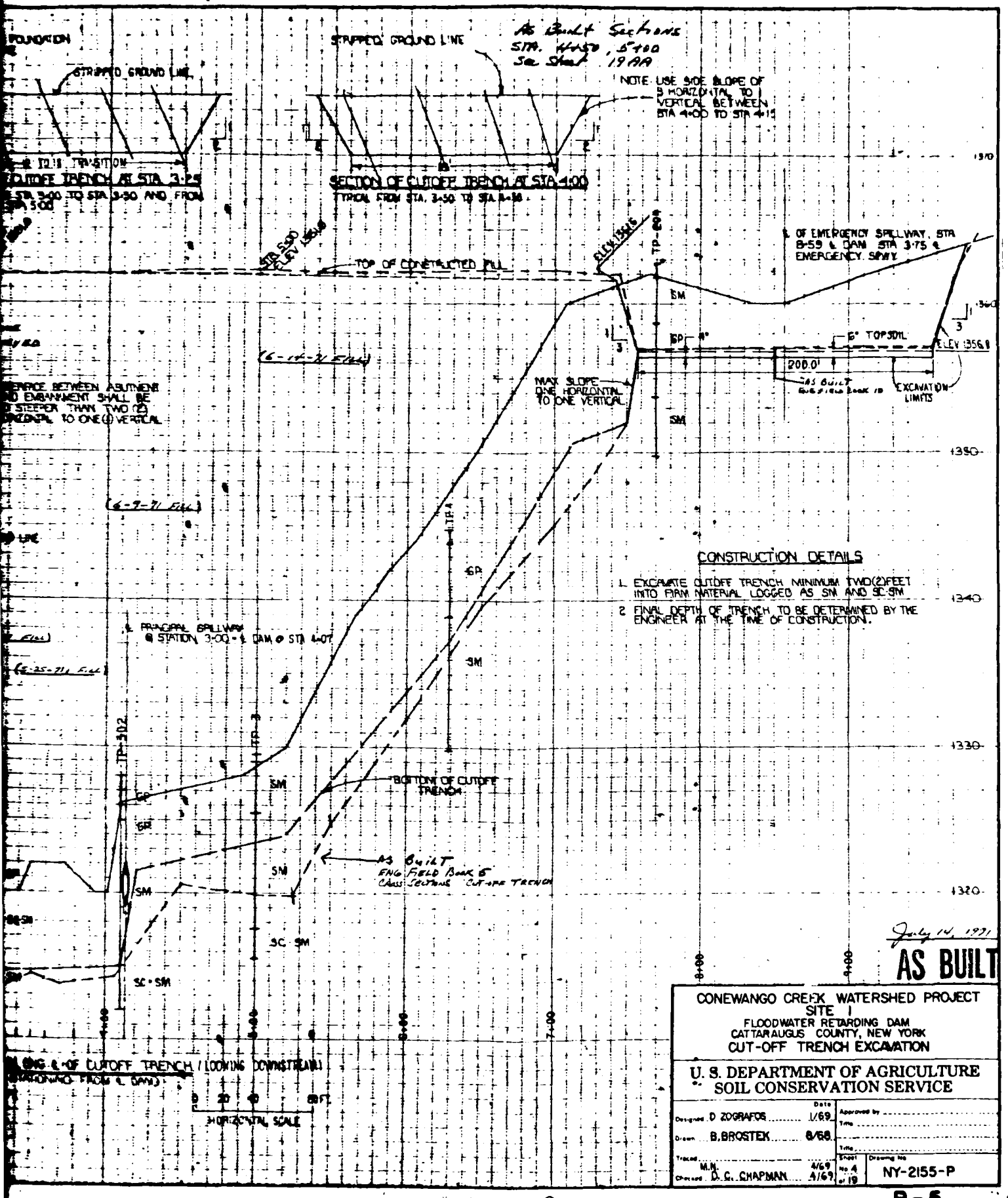


STATION	DEFLECTION	C-ORD DIST.
3+50		C.00
3+25		24.98
3+00		24.98
2+75		24.98
2+50	16°22'	24.98
2+25	20°28'	24.98
2+00	24°33'	24.98
1+75	28°39'	24.98
1+50	32°44'	24.98
1+25	36°50'	24.98
1+00	40°55'	24.98


FENCE
AS BUILT 884 FT
WASTE AREA
(AS BUILT)
Top Soil
ENG Field Book No 80
Page 12
TP 202
TP 207
TP 206
CURVE 2
AS BUILT
CONEWANGO CREEK WATERSHED PROJECT
SITE 1
FLOODWATER RETARDING DAM
CATTARAUGUS COUNTY, NEW YORK
PLAN OF STRUCTURAL WORKS
NY-2155-P

B-4


As Built Sections
Sta 2+20, 2+90, 3+42
See Sheet 18A
STRIPPED GROUND OR FOUNDATION EXCAVATION LINE
STRIPPED GROUND LINE
SECTION OF CUTOFF TRENCH AT STA 5+00
TYPICAL FROM APPROX STA 4+80 TO STA 5+00 AND FROM STA 5+00 TO APPROX STA 5+20
SECTION OF CUTOFF TRENCH AT STA 3+
TYPICAL FROM STA 3+00 TO STA 3+50 AND FROM STA 4+50 TO STA 5+00
MAXIMUM SLOPE ONE HORIZONTAL TO ONE VERTICAL
SLOPE LINE AS SURVEYED
INTERFACE BETWEEN ABUTMENT AND EMBANKMENT SHALL BE NO STEEPER THAN TWO (2) HORIZONTAL TO ONE (1) VERTICAL
SECTION OF FOUNDATION EXCAVATION
SEE FOUNDATION EXCAVATION DETAILS, SHEET 18
GROUND LINE
6-9-71 Fill
6-1-71 Fill
6-25-71 Fill
PRINCIPAL SPILLWAY @ STATION
2+20
2+50
3+00
3+50
4+00
4+50
5+00
5+75
6+50
7+00
7+50
℄ OF DAM
℄ OF CUTOFF TRENCH
20'
20'
℄ OF PRINCIPAL SPILLWAY
0 50 00 200
SCALE IN FEET
PLANVIEW OF CUTOFF TRENCH
Cut off Trench Changed Ref: Eng Tech. No. 5 Page 18
TP-302
TP-2
GP
SM
SC-SM
SC • SM
PROFILE ALONG ℄ OF CUTOFF TRENCH
(ALL STATIONING FROM ℄ DAM)
0 2 4 8FT
VERTICAL SCALE

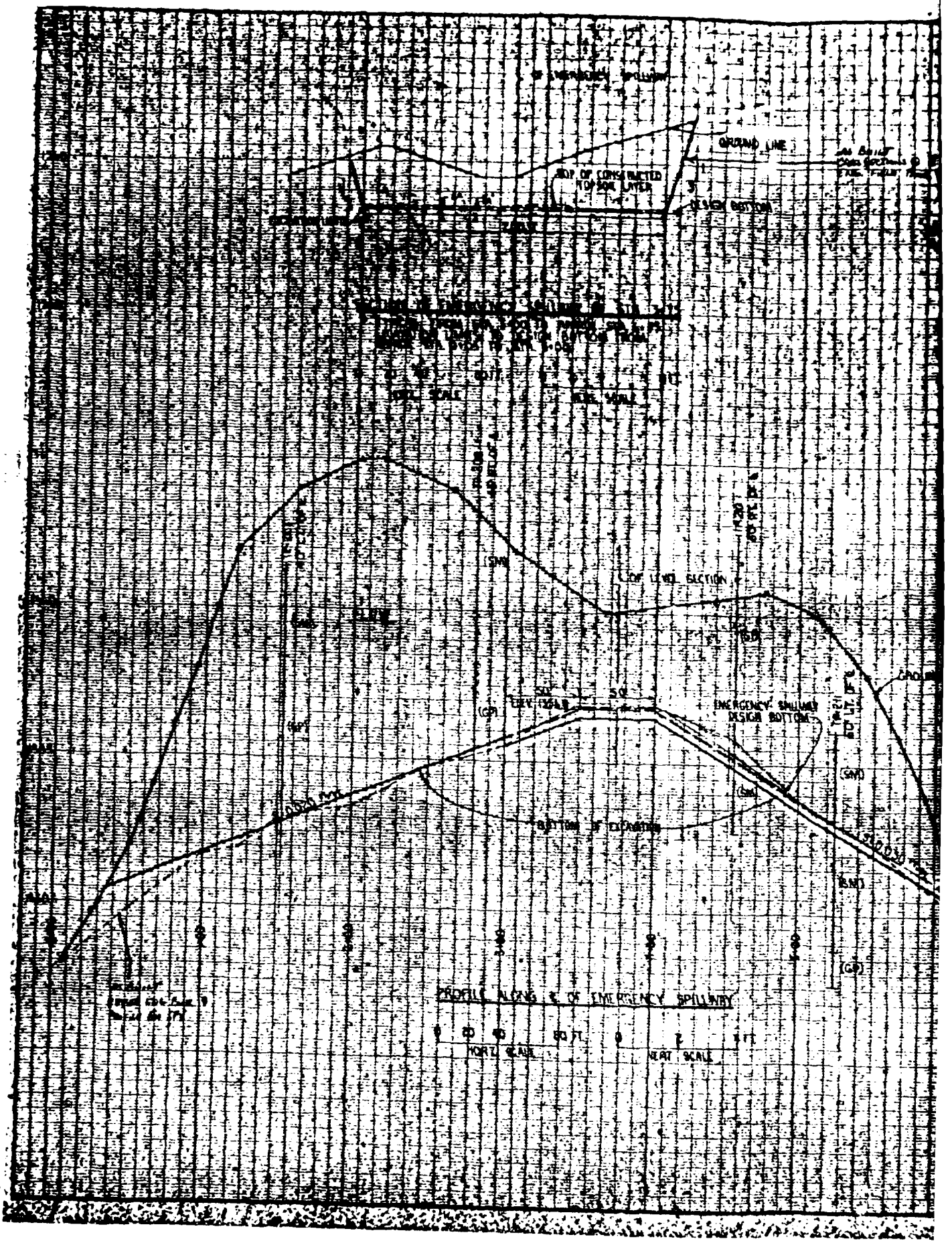


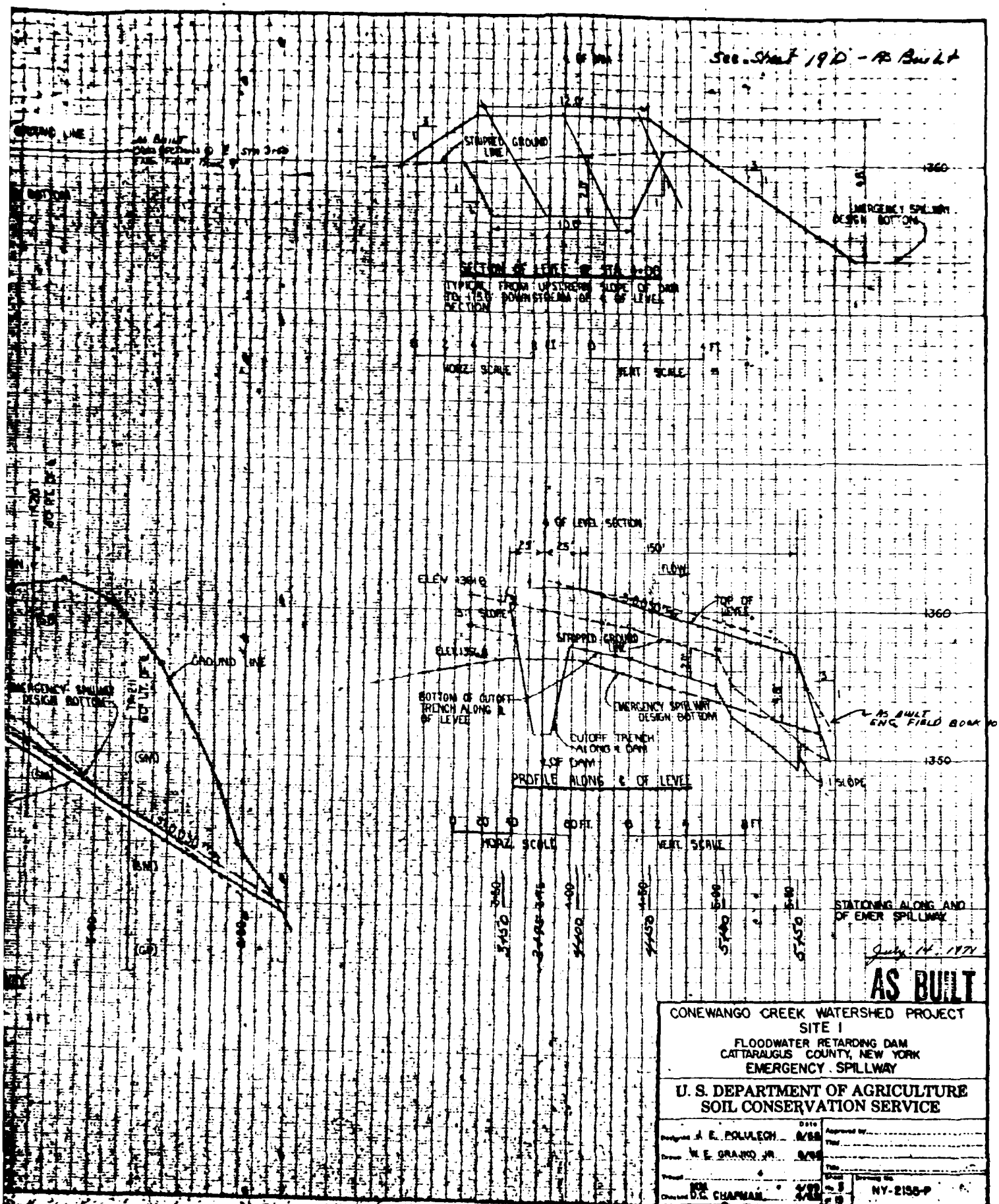
CONEWANGO CREEK WATERSHED PROJECT
SITE 1
FLOODWATER RETARDING DAM
CATTARAUGUS COUNTY, NEW YORK
CUT-OFF TRENCH EXCAVATION

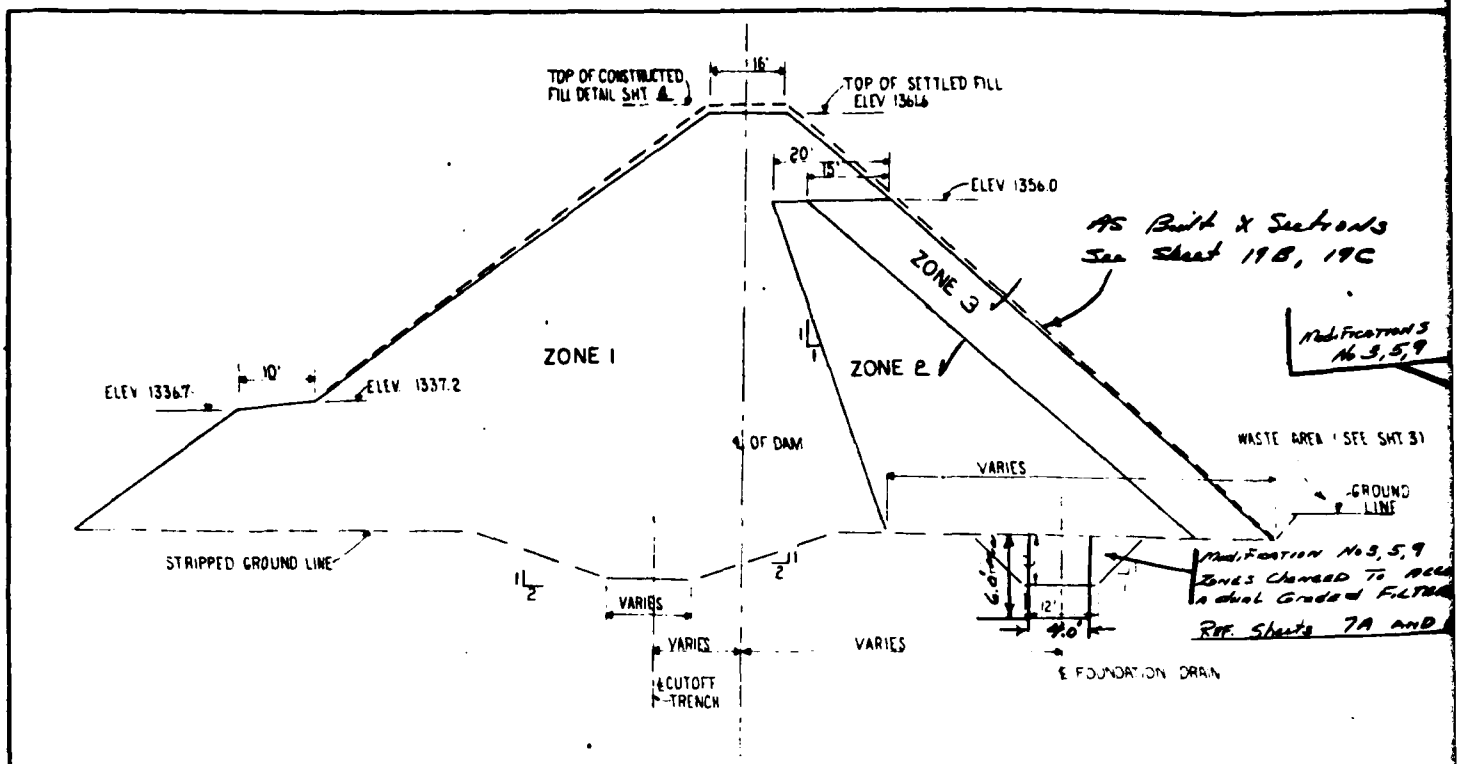
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Designed D ZOGRAFOS	Date 1/69	Approved by	
Drawn B.BROSTEK	8/68	Title	
Traced M.N.	4/69	Title	
Checked D. C. CHAPMAN	4/69	Sheet No. 4 of 19	Drawing No. NY-2155-P

B-5

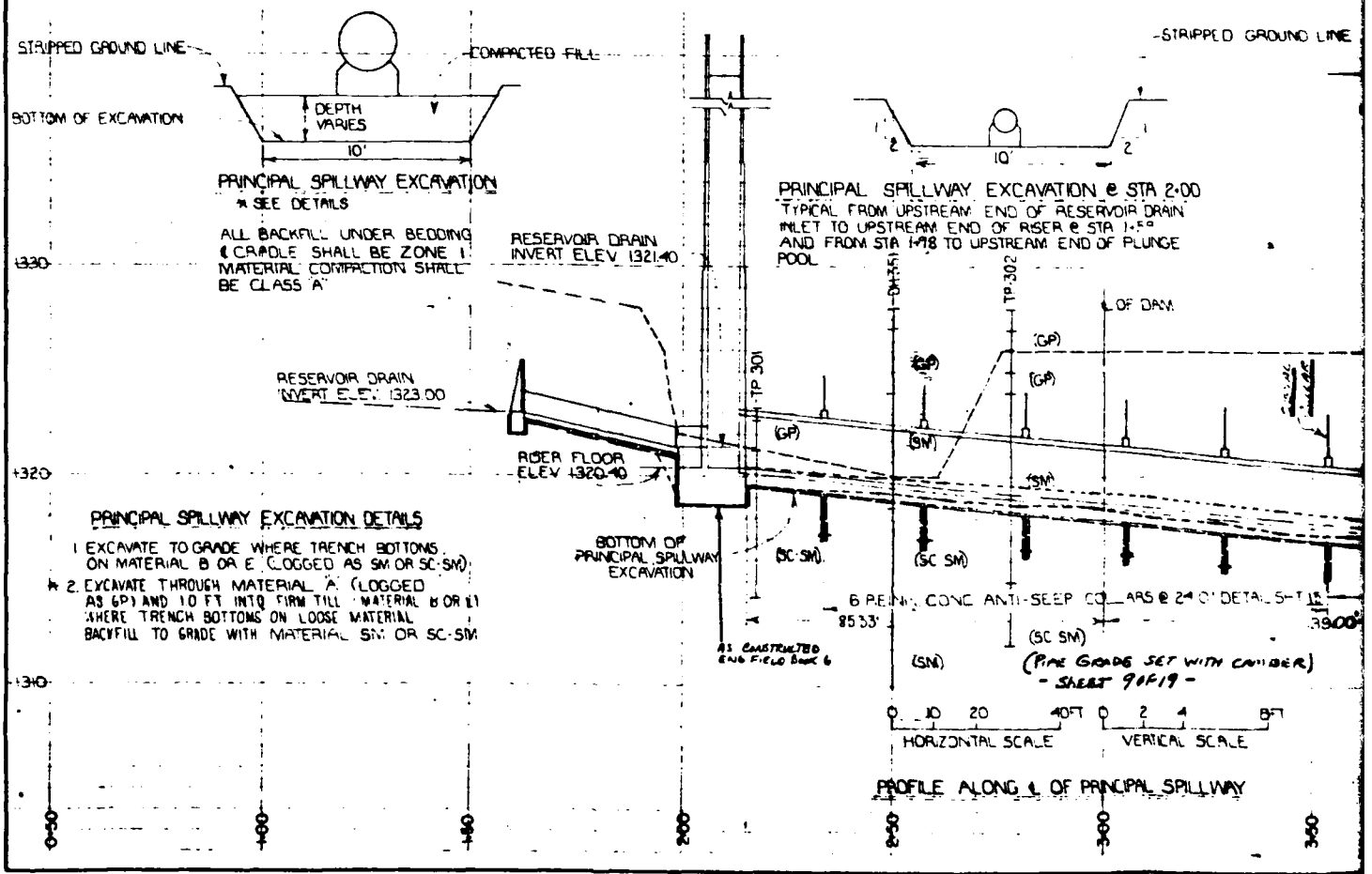

GROUND LINE
TOP OF CONSTRUCTED TOPSOIL LAYER
DESIGN BOTTOM
TOP OF LOW SECTION
EMERGENCY SPILLWAY DESIGN BOTTOM
BOTTOM OF EXCAVATION
PROFILE ALONG ℄ OF EMERGENCY SPILLWAY
HORIZ SCALE
VERT SCALE


See Sheet 19D - As Built
STRIPPED GROUND LINE
EMERGENCY SPILLWAY DESIGN BOTTOM
SECTION OF LEVEE @ STA 3+00
TYPICAL FROM UPSTREAM TOE OF DAM STA 3+00 DOWNSTREAM OF ℄ OF LEVEE SECTION
HORIZ. SCALE
VERT. SCALE
℄ OF LEVEE SECTION
ELEV 1360.0
5:1 SLOPE
TOP OF LEVEE
ELEV 1354.0
BOTTOM OF CUTOFF TRENCH ALONG ℄ OF LEVEE
CUTOFF TRENCH ALONG ℄ DAM
℄ OF DAM
PROFILE ALONG ℄ OF LEVEE
GROUND LINE
AS BUILT ENG. FIELD BOOK
STATIONING ALONG AND OF EMER SPILLWAY
July 14, 1971
AS BUILT
CONEWANGO CREEK WATERSHED PROJECT
SITE I
FLOODWATER RETARDING DAM
CATTARAUGUS COUNTY, NEW YORK
EMERGENCY SPILLWAY
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
NY-2156-P



SECTION OF DAM AT STA 3+00

TYPICAL FROM APPROX STA 1+80 TO STA 7+58



EARTH FILL REQUIREMENTS

ZONE	MATERIAL 1/	MAX ROCK SIZE 2/	MAX. LIFT THICK 3/	REQUIRED WATER CONTENT 4/	COMPACTION 5/ CLASS	COMPACTION 5/ DEFINITION
1	MATERIALS B 'D' 'E' G' AND 'H' AS LABELLED ON SHEET 12 AND REPRESENTED BY TP 101 FROM 1' TO 12' TP 211 FROM 29' TO 73' TP 212 FROM 35' TO 8' TP 206 FROM 0.5' TO 27' TP 401 FROM 2' TO 5' TP 202 FROM 1.5' TO 5.5'	6"	9"	[illegible] CONTENT SHALL BE 2 PERCENTAGE POINTS [illegible] OPTIMUM	A	97% STD. DENSITY BASED ON ASTM D-698, METHOD A
2	MATERIAL 'A' AS LABELLED ON SHEET 12 AND REPRESENTED BY TP 205 FROM 2.0'-4.5'	6"	9"	WET 6/	V	SEE CONSTRUCTION SPECIFICATION 5
3	SAME AS MATERIAL IN ZONE 2 PLUS OVERSIZE REMOVED FROM ZONE 2	18"	27"	WET 6/	V	SEE CONSTRUCTION SPECIFICATION 5

Revisions Nos 3, 5, 9

WASTE AREA (SEE SHT 3)

GROUND LINE

Modification No 3, 5, 9
Zones Changed To Allow a dual Graded FILTER

Ref Sheets 7A AND 8A

IN DRAIN

1/ THE PLACEMENT TABLE INDICATES [illegible] WATER [illegible] OF MATERIALS.
2/ MAXIMUM ROCK SIZE PLACED IN HAND COMPACTED BACKFILL SHALL BE 3 INCHES
3/ MAXIMUM LIFT THICKNESS PRIOR TO COMPACTION
4/ WATER CONTENT AT TIME OF COMPACTION
5/ FOR TYPICAL COMPACTION CURVES SEE SHEET 12
6/ WET MATERIAL THOROUGHLY BUT NOT EXCESSIVELY TO CAUSE SOIL TO ADHERE TO WHEELS OR TRACKS OF EQUIPMENT OR TO BOG DOWN EQUIPMENT

CONSTRUCTION DETAILS

1 THE FOUNDATION SURFACE THROUGH THE BASE AREA OF THE DAM SHALL BE SCARIFIED TO A DEPTH OF 6 INCHES AND COMPACTED PRIOR TO PLACEMENT OF FILL MATERIAL

2 ZONE BOUNDARIES INDICATED ARE APPROXIMATE. ADJUSTMENTS WILL BE MADE BY THE ENGINEER TO PERMIT THE CONTRACTOR TO UTILIZE SUITABLE USABLE REQUIRED EXCAVATION WITHIN THE NEAT LINES OF THE EMBANKMENT.

3 ~~TOP SOIL THAT IS TAKEN FROM SITE AND PLACED ON [illegible] PLACED AREAS IF IT IS FOUND SUITABLE AND WILL BE INCORPORATED WITHIN THE SLOPES OF THE EARTH FILL AS DIRECTED BY THE ENGINEER~~

STRIPPED GROUND LINE

N @ STA 2+00
ERVOIR DRAIN
STA 1+58
D OF PLUNGE

PRINCIPAL SPILLWAY EXCAVATION
SECTION @ ANTI-SEEP COLLARS

STRIPPED GROUND LINE

16.0'

PRINCIPAL SPILLWAY EXCAVTION
SECTION @ STATION 2+10
TYPICAL FROM STATION [illegible] TO STATION [illegible]

1330

℄ OF DAM

TP 303

AS PLACED ENG. FIELD BOOK 6

GROUND LINE

(GP) ℄ OF BENT

8.0'

SC 9M

INVERT ELEV 1316.2

NOTE FOR GUIDES FOR (CUT-IN) ANTI-SEEP COLLARS, PRINCIPAL SPILLWAY, SEE ALSO LETTER TO ENGINEER FIELD BOOK 10 6

1320

COLLARS @ 24.0' DETAIL SHT 12

85.0'

39.00'

(GUIDES SET WITH CAMBER)
SHT 9 OF 19 -

0 2 4 8FT
VERTICAL SCALE

PRINCIPAL SPILLWAY

BOTTOM OF PRINCIPAL SPILLWAY EXCAVATION
AS CONSTRUCTED
BOTTOM PRIN SPW. EXCAVATION
ENG. FIELD BOOK 6

SEE SHEET 9 FOR EXCAVATION OF PLUNGE POOL

ENG Field Book No 9 Pages 18-19

300 350 400 450

July 14, 1971

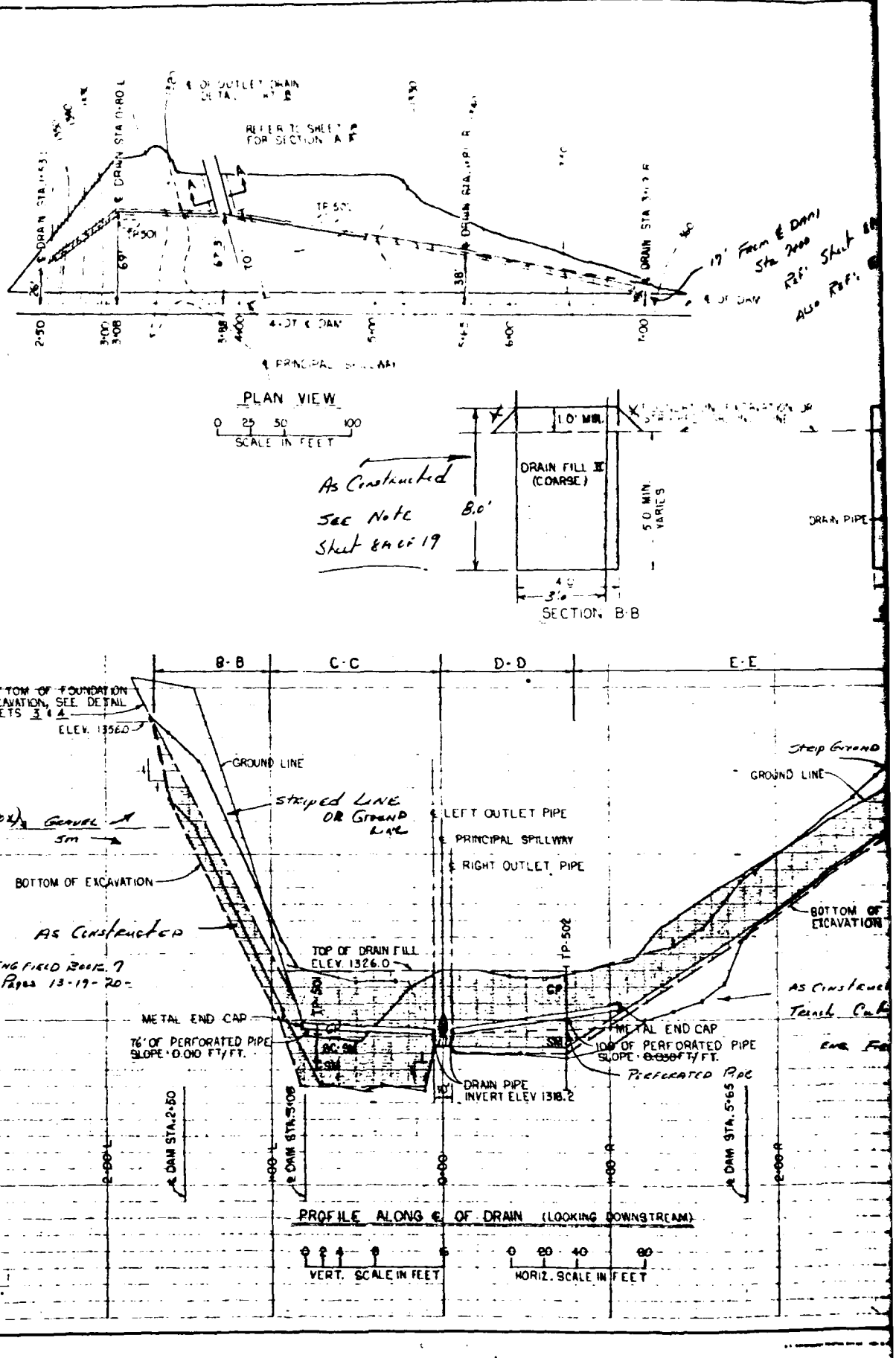
AS BUILT

CONEWANGO CREEK WATERSHED PROJECT
SITE 1
FLOODWATER RETARDING DAM
CATTARAUGUS COUNTY, NEW YORK
FILL PLACEMENT & PRIN SPWY EXCAVATION
U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

D ZOGRAFOS	2-69	
J DE VITA III	2-68	
D ZOGRAFOS	3-69	NY-2155-P

B-7

2


REFER TO SHEET 8 FOR SECTION A-A
TP-501
TP-502
PLAN VIEW
0 25 50 100
SCALE IN FEET
PRINCIPAL SPILLWAY
As Constructed
See Note
Sheet 8 & of 19
DRAIN FILL II (COARSE)
8.0'
1.0' MIN.
5.0 MIN. VARIES
DRAIN PIPE
SECTION B-B
B-B
C-C
D-D
E-E
BOTTOM OF FOUNDATION EXCAVATION, SEE DETAIL SHEETS 3 & 4
ELEV. 1356.0
GROUND LINE
Striped LINE OR Ground Line
(APPROX.) Gravel
5m
BOTTOM OF EXCAVATION
As Constructed
ENG FIELD BOOK 7
Pages 13-19-20
TOP OF DRAIN FILL ELEV. 1326.0
LEFT OUTLET PIPE
PRINCIPAL SPILLWAY
RIGHT OUTLET PIPE
METAL END CAP
76' OF PERFORATED PIPE SLOPE 0.010 FT/FT.
DRAIN PIPE INVERT ELEV 1318.2
Perforated Pipe
Steep Ground
GROUND LINE
BOTTOM OF EXCAVATION
METAL END CAP
100' OF PERFORATED PIPE SLOPE 0.050 FT/FT.
1360
1340
1320
1300
PROFILE ALONG ℄ OF DRAIN (LOOKING DOWNSTREAM)
VERT. SCALE IN FEET
HORIZ. SCALE IN FEET

GRAIN SIZE DESCRIPTION FOR DRAIN FILL

1. DRAIN FILL I (FINE) SHALL MEET THE GRADATION OF ASTM C33-67 FOR FINE AGGREGATE. IN ADDITION, THE PERCENTAGE OF MATERIAL IN DRAIN FILL I FINER THAN A #200 SIEVE SHALL NOT BE MORE THAN 3 PERCENT.

2. DRAIN FILL II (COARSE) SHALL MEET THE GRADATION OF [illegible] COARSE AGGREGATE #1. IN ADDITION, THE PERCENTAGE OF MATERIAL IN DRAIN FILL II FINER THAN A #[illegible] SIEVE SHALL NOT BE MORE THAN [illegible] PERCENT.

DRAINAGE [illegible]

1. ALL DRAIN PIPE SHALL CONFORM TO SPECIFICATION [illegible] IN SHALL BE [illegible]" DIA., SHALL [illegible] OF CLASS [illegible] AND A

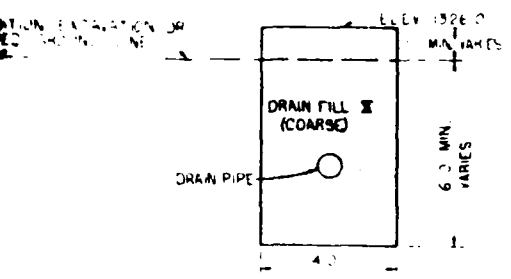
2. THE PROFILE, AT THE [illegible] SHOWN ARE ONLY APPROX[illegible] WILL BE ESTABLISHED IN THE FIELD A[illegible] CONSTRUCTION BY THE ENGINEER.

[illegible] AS

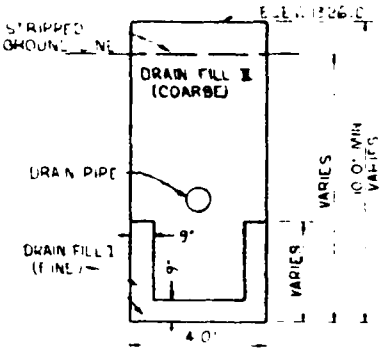
670 CU. YDS. DRAIN FILL II (COARSE)
70 CU. YDS. DRAIN FILL I (FINE)
264 FT. OF 8" DIA. PERFORATED PIPE
6[illegible] FT. OF 8" DIA. NON PERFORATED PIPE
(1) 3-PIECE 22½° ELBOW 8" DIA. (INTERNAL ANGLE)
(1) 3-PIECE 11½° 30" ELBOW 8" DIA. (INTERNAL ANGLE)
(2) SMALL ANIMAL GUARDS
(2) METAL END CAPS

17' From ℄ Dam Sta 2+00 Ref: Sheet 8A of 19 Also Ref: Eng Field Book No. 7 Page 17

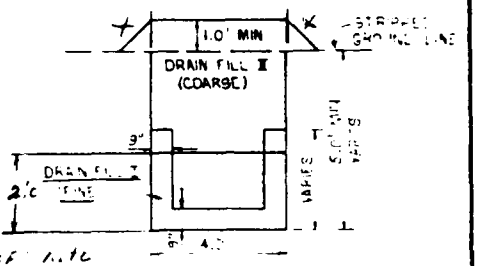
℄ OF DAM



SECTION C-C

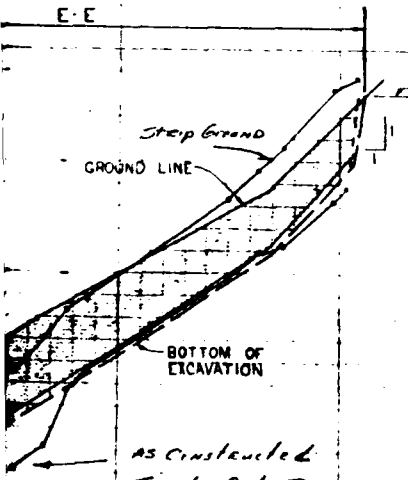


SECTION D-D



Ref: 1.1c
Sht 8A of 19

SECTION E-E



As Constructed
Trench Cut Thru Gravel in To Silt Material
Eng Field Book 7 Pages - 12-8-9

CAP
FED PIPE
FT.
to Proc

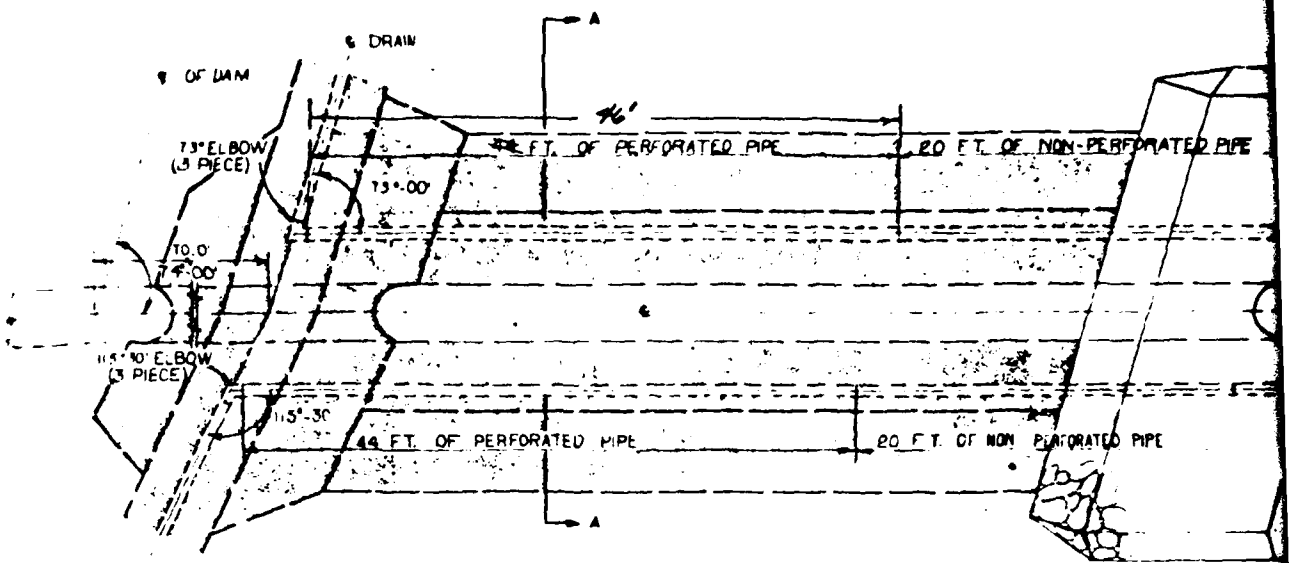
℄ DAM STA. 5+65
2-00-R
3-00-R
℄ DAM STA. 7+00

CONTRACT MODIFICATION NO. 3

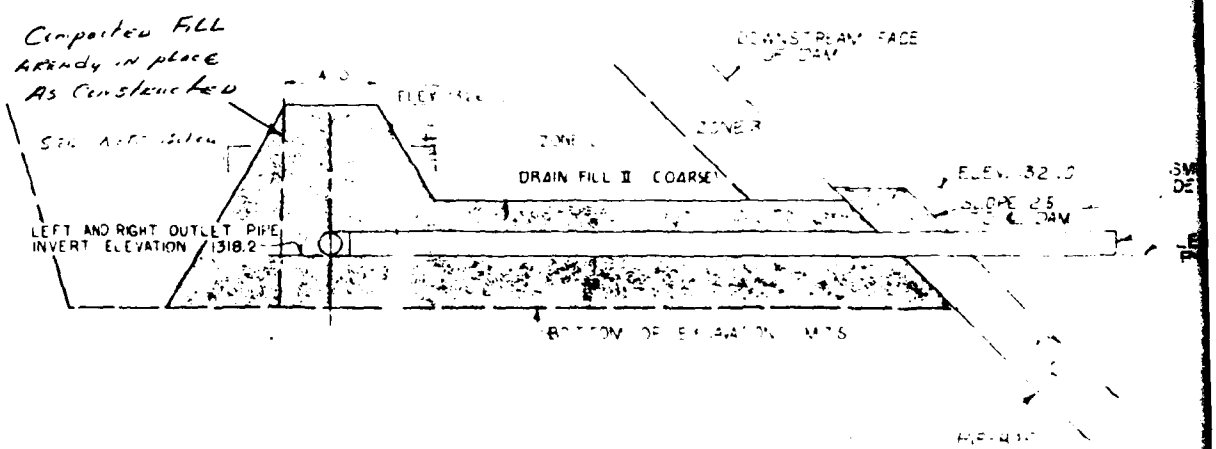
CONEWANGO CREEK WATERSHED PROJECT
SITE I
FLOODWATER RETARDING DAM
CATTARAUGUS COUNTY, NEW YORK
DRAINAGE SYSTEM

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

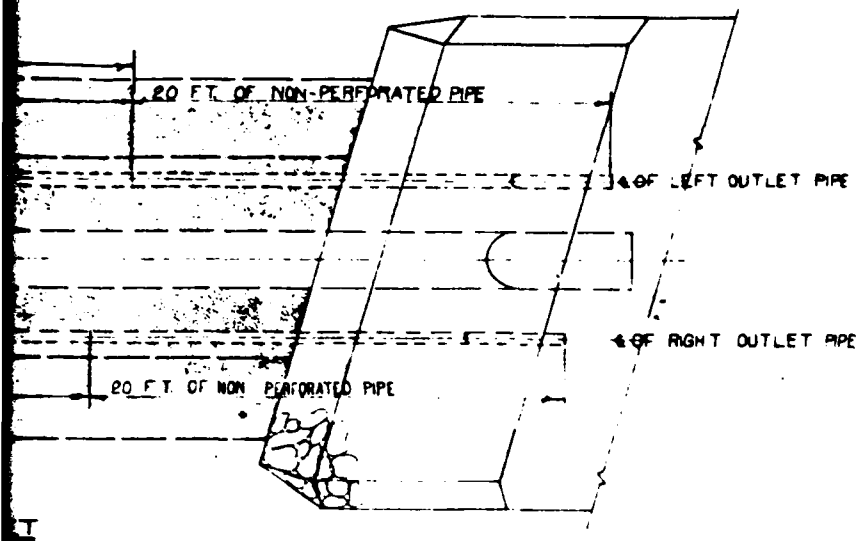
Designed	A FEHER	4-71	Approved by
	DENE ZOGRAFOS	2-69	Title
Drawn	D. ANGELO	11-69	Title
Traced			
Checked	J E POLULECH	4-71	Sheet No. 7A-19
			Drawing No. NY-2155-P

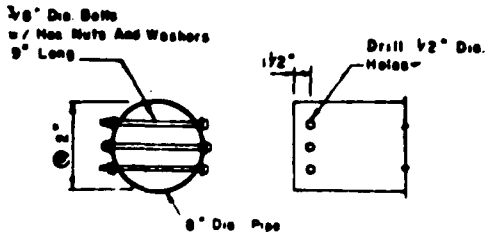


PLAN OF DRAIN OUTLET
(NOT TO SCALE)

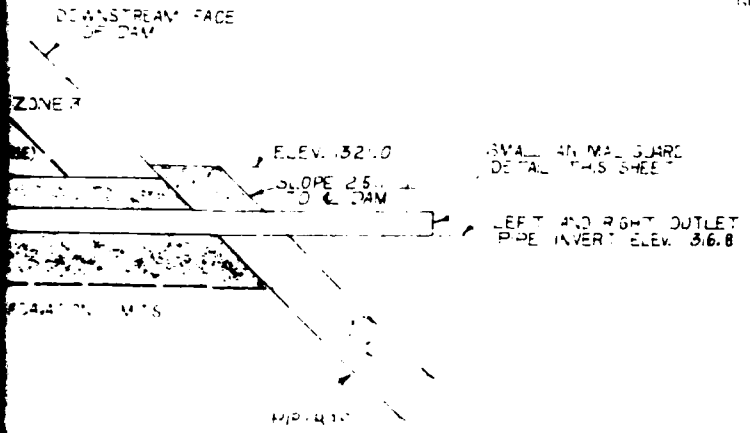


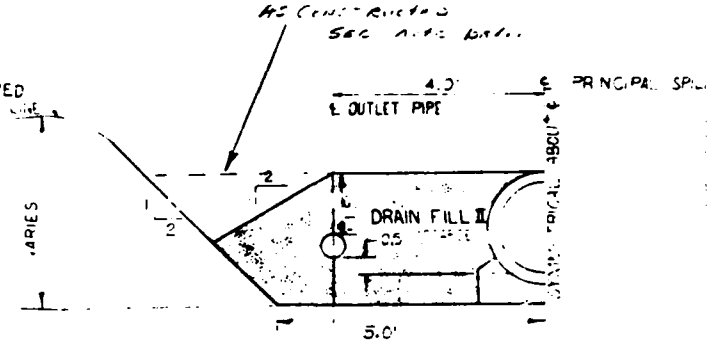
PROFILES ALONG DRAIN OUTLETS





SMALL ANIMAL GUARD DETAILS





SECTION A-A
(NOT TO SCALE)

OF 4 OUTLETS

Note (Sheet 7A of 19 - Sheet 8A of 19)
Ref. To Job Diary Report No
(107 - 108)
All Changes Made ck 13y
Jesse Clicks And Dr. Shacklin

CONTRACT MODIFICATION # 3

CONEWANGO CREEK WATERSHED PROJ
SITE 1
FLOODWATER RETARDING DAM
CATTARAUGUS COUNTY, NEW YORK

DRAINAGE SYSTEM

U. S. DEPARTMENT OF AGRICULTUR
SOIL CONSERVATION SERVICE

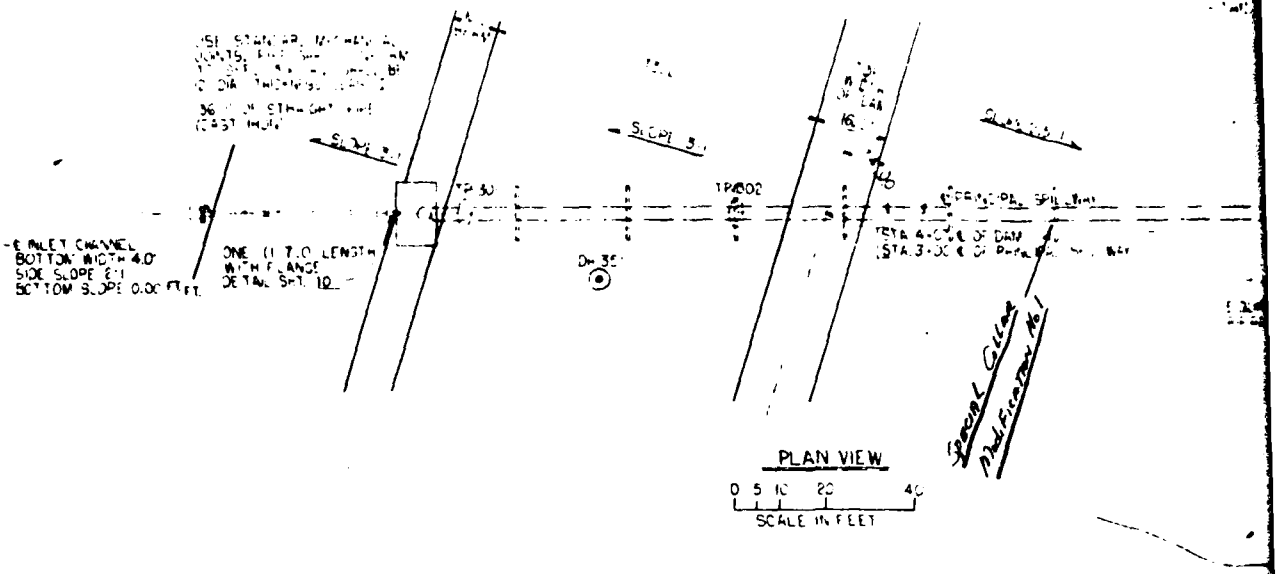
A FEHER	4-71	
DENE ZOGRAFOS	2/69	
D. BURDICK	3/69	
JEP	4-71	
D.C.E.	4-71	
N.Y.	4 69 / 3 68	8A / B

NY-2155-P

B-9

1

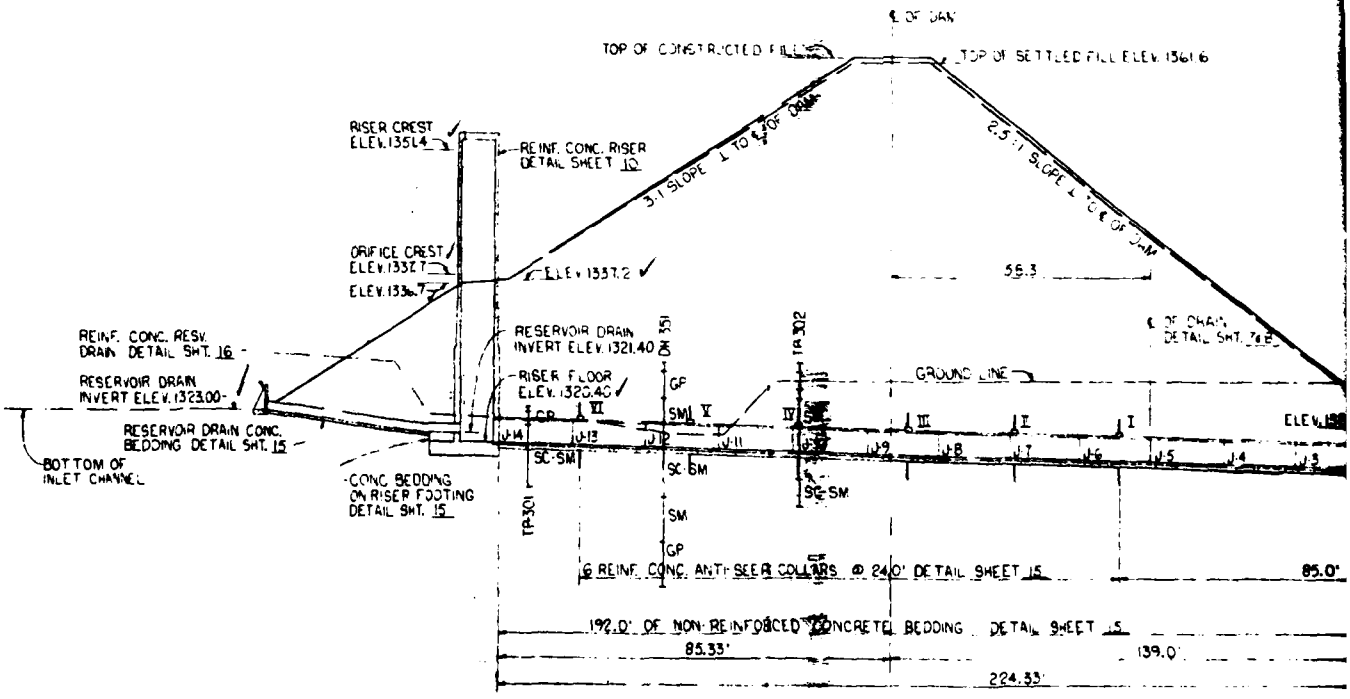
2



PLAN VIEW

0 5 10 20 40

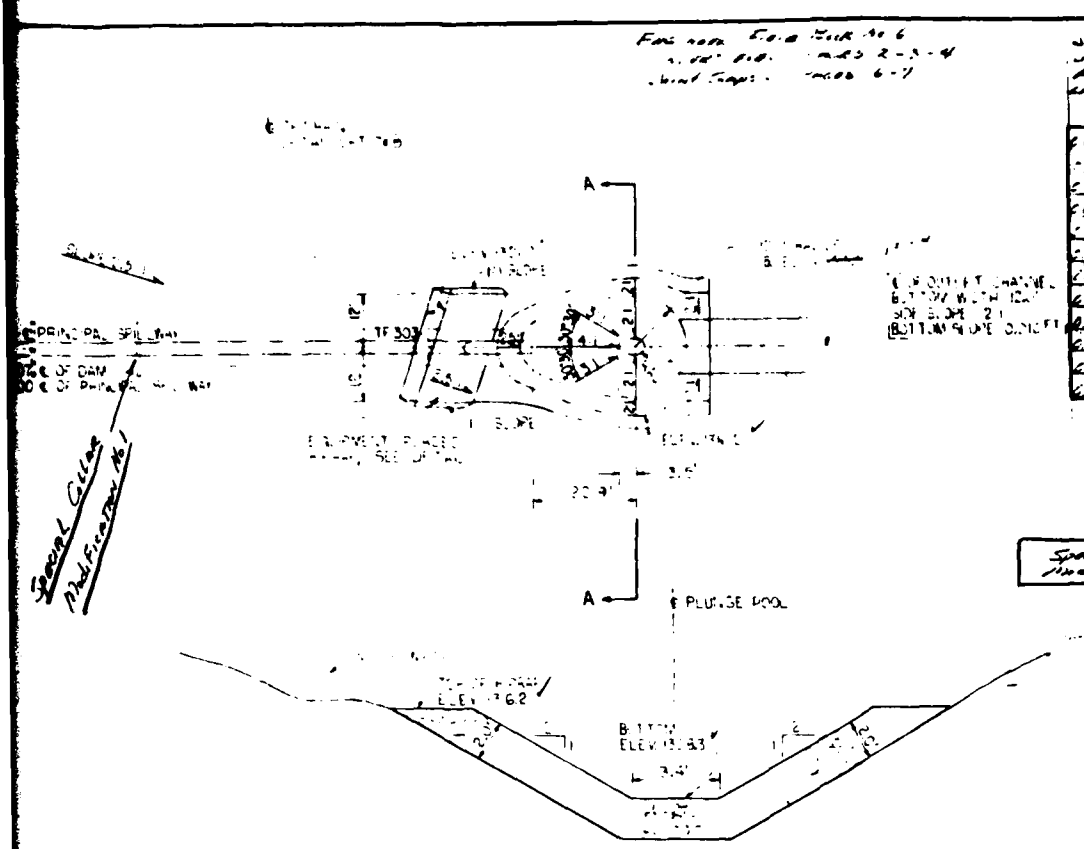
SCALE IN FEET



PROFILE ALONG ℄ OF PRINCIPAL SPILLWAY

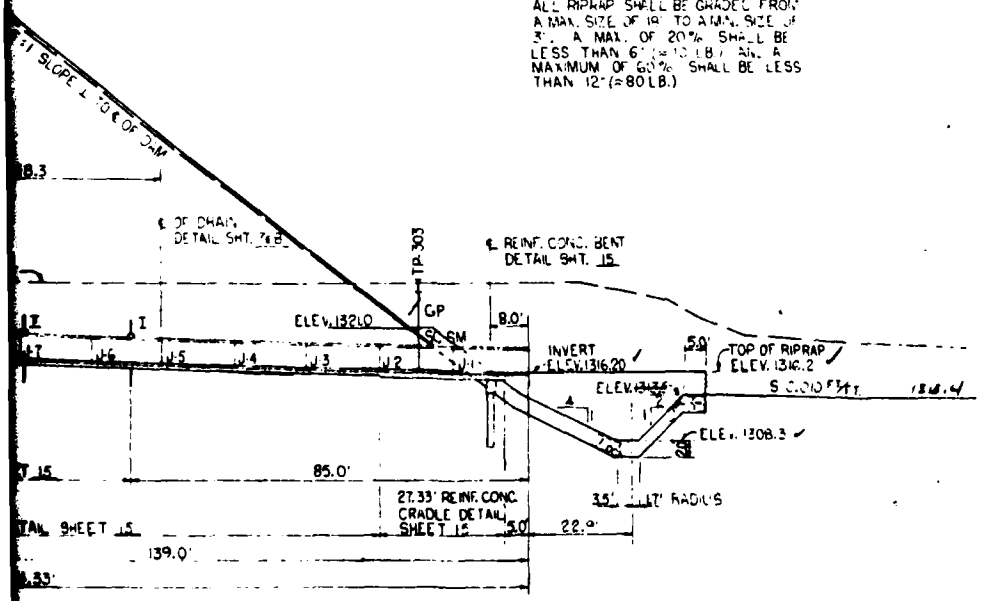
0 5 10 20 0 10 20 40

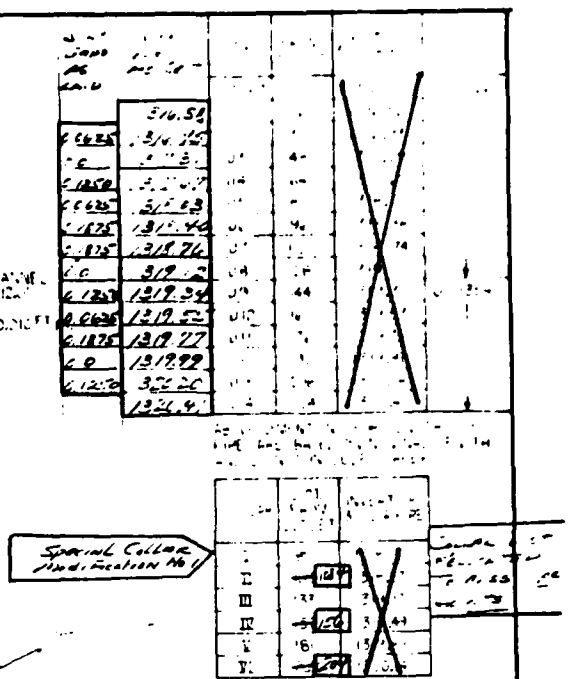
VERT. SCALE IN FEET HORIZ. SCALE IN FEET



RIPRAP DETAILS

ALL RIPRAP SHALL BE GRADED FROM A MAX. SIZE OF 18" TO A MIN. SIZE OF 3". A MAX. OF 20% SHALL BE LESS THAN 6" (=10 LB.) AND A MAXIMUM OF 60% SHALL BE LESS THAN 12" (=80 LB.)





30 REINFORCED CONCRETE PIPE STRENGTH REQUIREMENTS

FABRICATION INSTRUCTIONS		
(14) [illegible] SECTIONS ONE (1) SPIGOT RING WALL FITTING FOR 15" WALL	OR	( ) [illegible] SECTIONS (1) [illegible] SECTION ONE (1) SPIGOT RING WALL FITTING FOR [illegible] WALL
PIPE SUPPLIERS NOTE: CAST OUTSIDE OF SPIGOT RING WITH CONCRETE IN ONE [illegible] SECTION.		PIPE SUPPLIERS NOTE: CAST OUTSIDE OF SPIGOT RING WITH CONCRETE IN ONE [illegible] SECTION.

WHEN PIPE IS SUPPLIED IN 20.0' LENGTHS, THE ENGINEER WILL PROVIDE THE CONTRACTOR WITH A REVISION OF THIS SHEET SHOWING ORDER OF INSTALLATION AND PIPE INVERT ELEVATIONS.

July 14, 1971

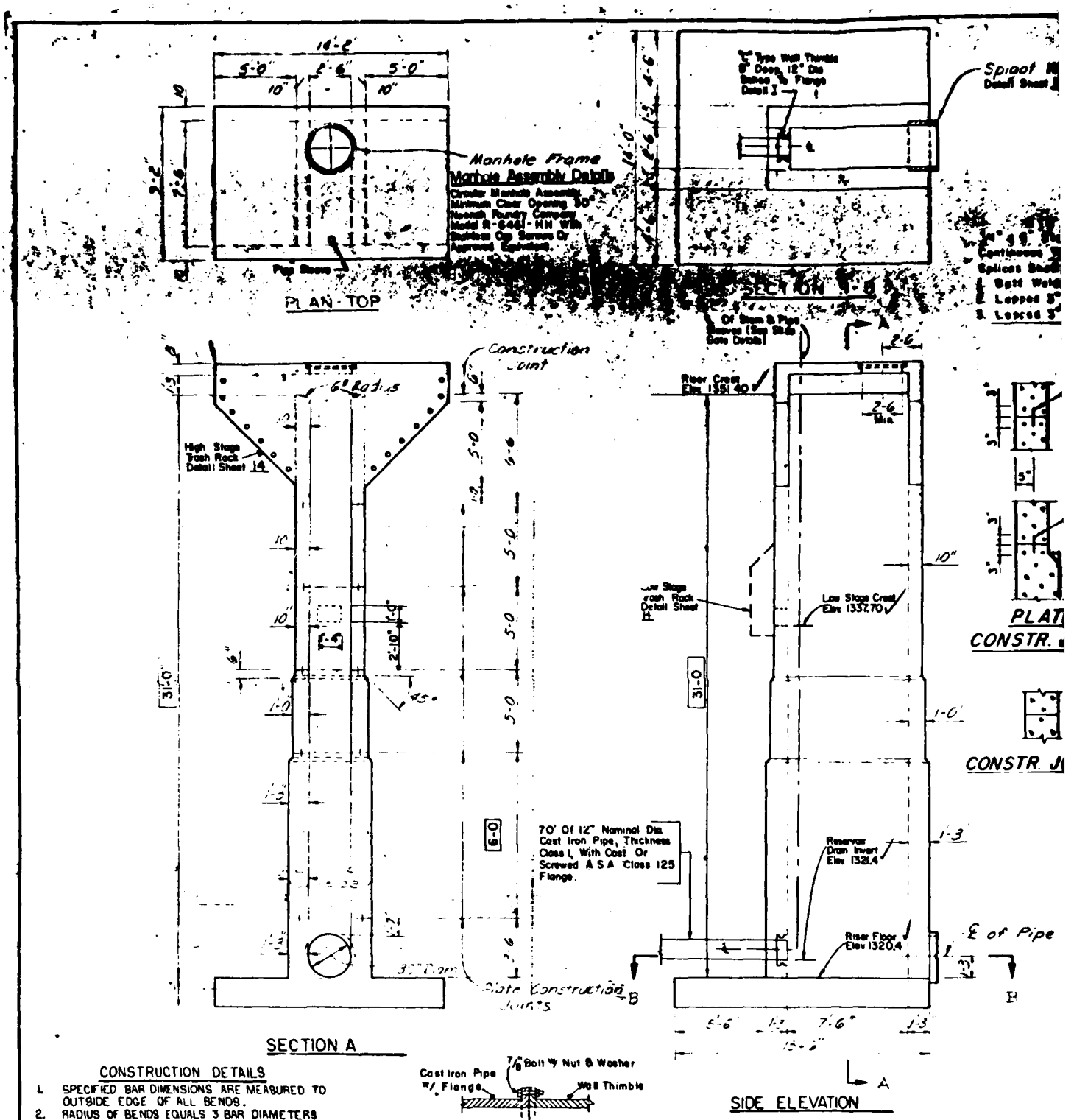
AS BUILT

CONEWANGO CREEK WATERSHED PROJECT
SITE I
FLOODWATER RETARDING DAM
CATTARAUGUS COUNTY, NEW YORK
PLAN PROFILE OF PRINCIPAL SPILLWAY

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

D ZOGRAFOS	12/68	
D ANGELO	12/68	
J E POLULECH	4/69	NY-2155-P

B-10



CONSTRUCTION DETAILS

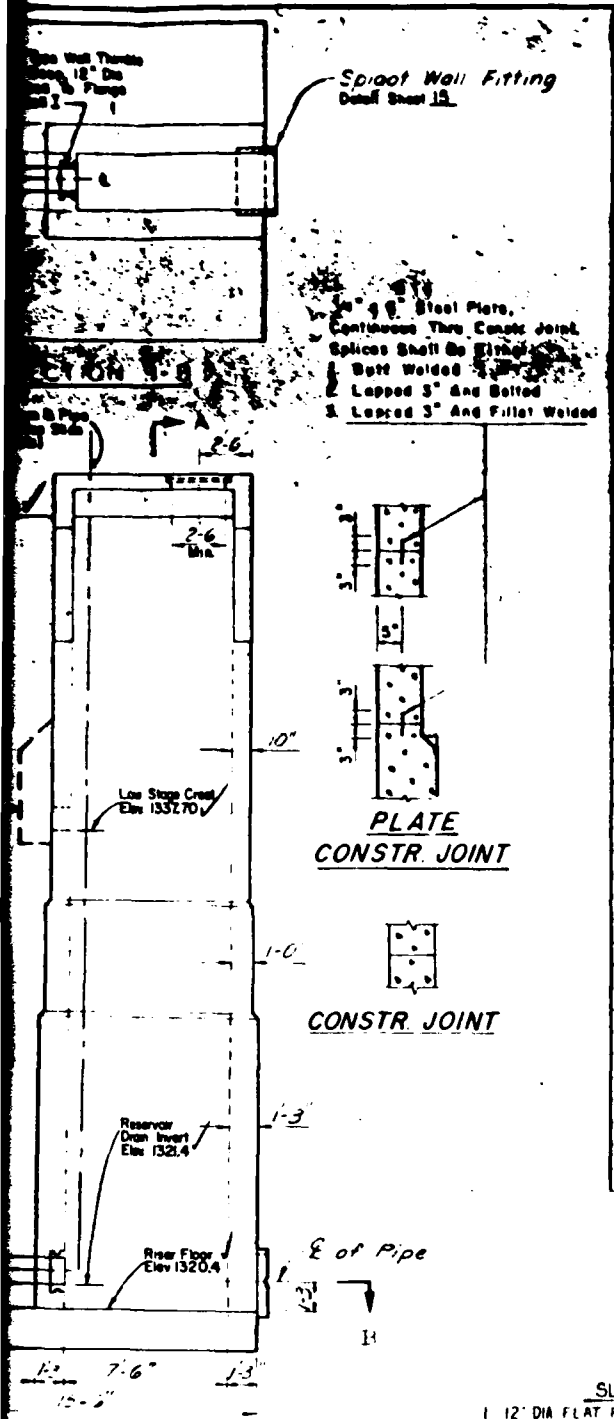
1. SPECIFIED BAR DIMENSIONS ARE MEASURED TO OUTSIDE EDGE OF ALL BENDS.
2. RADIUS OF BENDS EQUALS 3 BAR DIAMETERS FOR SIZES EQUAL TO OR LESS THAN #7.
3. THE 2" AND 3" DISTANCE FROM SPECIFIED CONCRETE SURFACES ARE CLEAR DISTANCES WHERE NOT OTHERWISE SPECIFIED ALL REINFORCING STEEL PLACED IN CONCRETE POURED AGAINST THE GROUND SHALL HAVE A MINIMUM OF 3" COVER. ALL REINFORCING STEEL PLACED IN CONCRETE POURED IN FORMS SHALL HAVE A MINIMUM OF 2" CLEAR COVER.
4. ALL EXPOSED EDGES OF CONCRETE TO HAVE A 3/4" CHAMFER UNLESS OTHERWISE NOTED.

QUANTITIES

Item			
#4 Bars	[illegible]	Lin. Ft.	[illegible] Lbs.
#5 Bars	3545-0	Lin. Ft.	3697 Lbs.
#6 Bars	1695-10	Lin. Ft.	2547 Lbs.
#7 Bars	705-6	Lin. Ft.	1238 Lbs.
#8 Bars	454-3	Lin. Ft.	1226 Lbs.
		Total	8948 Lbs.

Length of #5 Bars = (4511-0), Length of Bars #2, #3, #4 or #5.
Length of #6 Bars = 242-0", Length of Bars #2, #3, #4 or #5.

Total Concrete [illegible] 47.5 Cu. Yds.



STEEL SCHEDULE

Mark	Size	Quantity	Length	Type	B	C	Total Length
B1	#7	16	13-6	1			216-0
B2	#8	14	15-0	1			210-0
B3	#6	13	7-9	1			100-9
B4	#	38	10-3	21	3-5	6-10	389-6
B5	#	14	15-0	1			210-0
B6	#6	10	13-6	1			135-0
B7	#8	11	12-6	1			148-6
B8	#6	2	6-0	1			12-0
B9	#6	6	7-9	21	1-0	6-9	46-6
B10	#6	19	7-9	21	1-0	6-9	147-3
B11	#5	14	8-6	1			119-0
B12	#6	3	5-6	1			17-6
B13	#6	3	2-9	1			8-3
B14	#6	2	2-9	1			5-6
B15	#6	10	6-9	21	0-10	3-11	67-6
B16	#6	18	9-3	21	3-4	5-11	166-6
R1	#	22	7-7	1			166-10
R2	#	4	8-6	1			34-0
R3	#	2	3-6	1			7-0
R4	#	2-	5-5	1			151-8
R5	#	8	9-3	21	3-6	5-11	74-0
R6	#	4	8-6	1			119-0
R7	#	10	3-6	1			35-0
R8	#	10	3-8				95-4
R9	#5	36	8-9	21	3-1½	5-7½	315-0
R10	#5	4	8-3	21	2-10½	5-4½	34-0
R11	#5	22	6-9	1			154-6
R12	#6	14	8-3				115-6
R13	#	10	3-6				35-0
R14	#	26	3-6	1			91-0
R15	#	10	2-3	1			21-0
R16	#	36	4-		1-10½	4-4½	237-0
R17	#5	3	5-0	21	2-9	5-3	15-0
R18	#	14	8-3	1			115-6
R20	#	3	8-8	1			26-0
R21	#	20	5-3	1			105-0
R22	#	40	5-1		2-9	5-3	205-0
R23	#	10	6-4	1			64-0
R24	#	3	3-3	1			9-9
R25	#5	18	8-0	21	3-3	5-3	224-0

Mark	Size	Quantity	Length	Type	B	C	Total Length
T1	#5	8	6-0	1			48-0
T2	#5	8	8-0	1			64-0
T3	#5	8	1-9	1			15-0
T4	#5	8	3-6	1			28-0
T5	#5	8	2-3	1			18-0
T6	#5	8	3-0	5	2-0	7-0	36-0
T7	#5	12	8-3	1			99-0
T8	#5	2	3-3	1			6-6
T9	#5	2	5-5	1			11-6
T10	#5	2	10-3	1			21-6
T11	#5	2	13-3	1			26-6
T12	#5	16	6-3	1			87-6
T13	#5	6	8-0	1			48-0
T14	#5	8	2-0	1			16-0
T15	#5	8	2-0	1			16-0
T16	#5	8	1-0	1			8-0
T17	#5	4	1-3	1			5-0
T18	#5	4	9-0	5	2-0	7-0	46-0
T19	#5	24	8-0	5	2-0	5-3	32-0
T20	#5	2	3-3	1			6-6
T21	#5	2	5-5	1			11-6
T22	#5	2	8-3	1			16-6
T23	#5	2	10-3	1			21-6
T24	#5	2	13-3	1			26-6
T25	#5	4	11-3	1			45-0
T26	#5	4	13-3	1			53-0
T27	#5	13	8-3	1			111-6
T28	#6	2	4-3	1			8-6
T29	#6	18	5-3				96-6
T30	#5	4	5-3	1			21-0
T31	#5	24	6-3	1	1-6	4-0	156-0
T32	#5	21	6-3	1	1-6	4-0	136-6
T33	#5	4	5-3	1			21-0

Bars Checked - Found To Meet Specs - Bars from Republic Steel Corporation Orders June 23 1970

TYPE 1

TYPE 2

TYPE 3

SLIDE GATE DETAILS

1. 12" DIA FLAT FRAME SLIDE GATE (SELF CONTAINED UNIT)
2. CLASS 0.32
3. SLIDE GATE SHALL CONFORM TO SPEC 301 AND SHALL BE TYPE MHS 1
4. "C" TYPE WALL THIMBLE 8" DEEP
5. PIPE SLEEVE, STEM, & STEM GUIDES SIZED AND SPACED ACCORDING TO MANUFACTURER'S RECOMMENDATIONS. REMOVABLE T HANDLE WRENCH, WRENCH SOCKET AND TOP OF STEM LOCATED WITHIN PIPE SLEEVE.
6. PAINT IN ACCORDANCE WITH SPEC. 22
7. HOLES DRILLED IN BACK FLANGE OF WALL THIMBLE BY GATE MANUFACTURER ACCORDING TO A.S.A. CLASS 125 FLANGE SPEC
   - DIAMETER OF BOLT CIRCLE 17"
   - NUMBER OF BOLT HOLES - 12"
   - DIAMETER OF BOLT HOLES - 1"

BLOCKED IN DIMENSIONS NOT TO SCALE

July 14 1971

AS BUILT

CONEWANGO CREEK WATERSHED PROJECT
SITE 1
FLOODWATER RETARDING DAM
CATTARAUGUS COUNTY, NEW YORK
RISER STRUCTURAL DETAILS
U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Designed D ZOGRAFOS 12/68

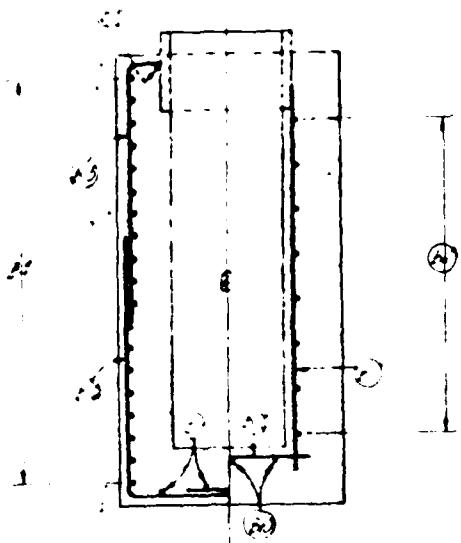
J.E. POLULECH 4/69 NY-2155-P

B-11

[4400] Lbs.
[3697] Lbs.
2547 Lbs.
1238 Lbs.
1226 Lbs.
[8948] Lbs.

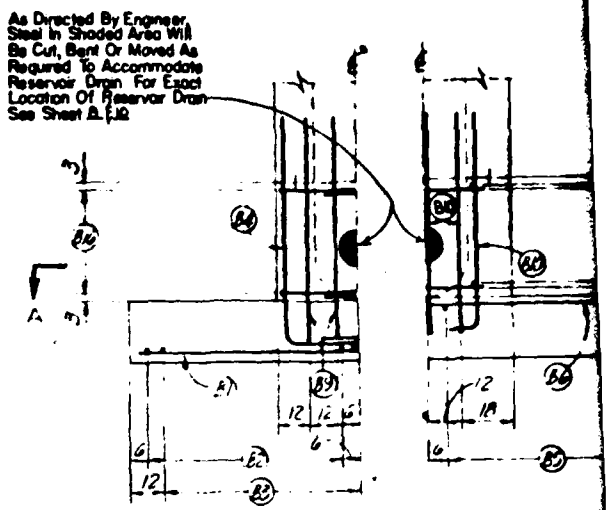
Bars #6
Bars #5 R2, R3, or R24.

[47.5] Cu. Yds.

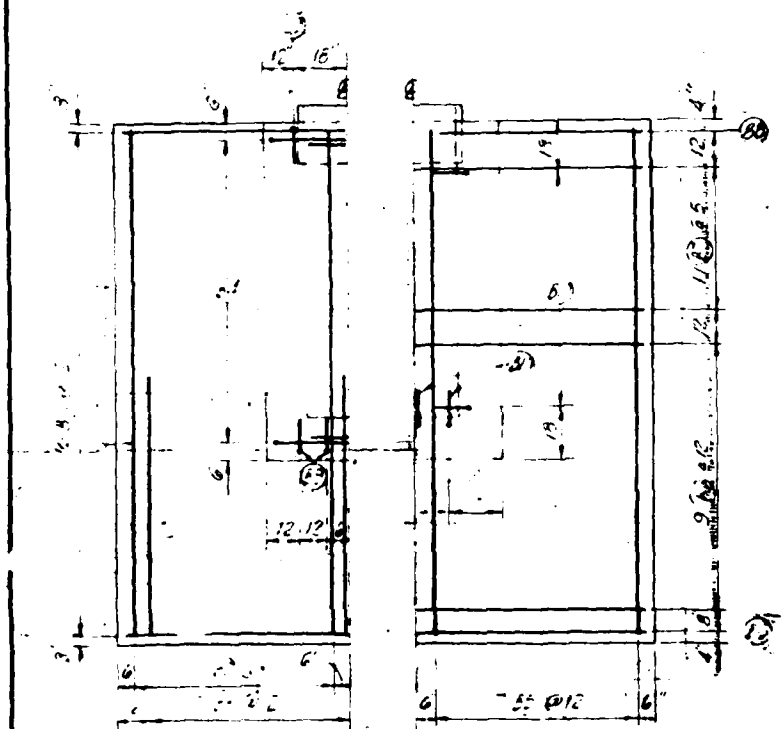


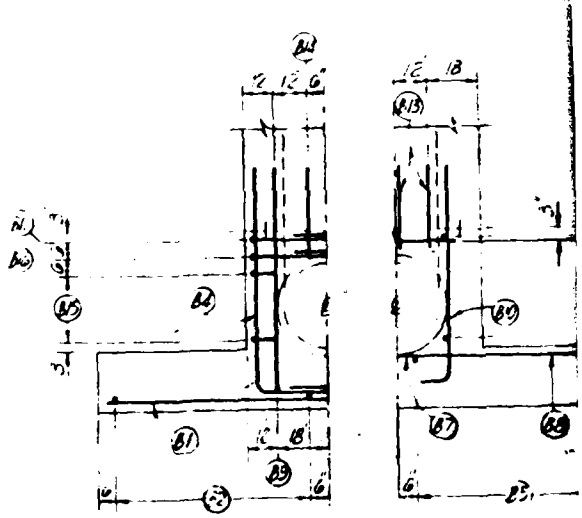
SECTION A A

0 1 2 3
Scale in Feet

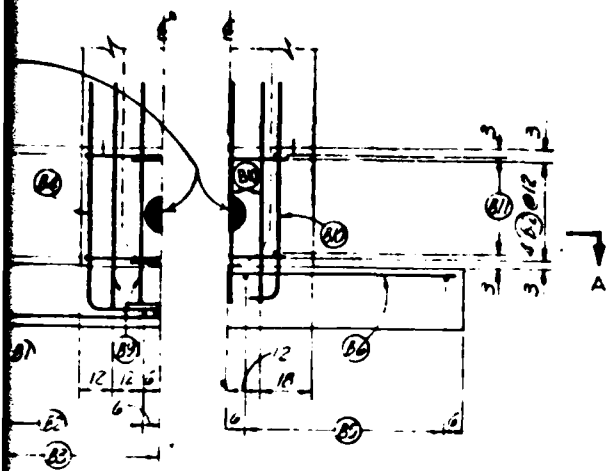


UPSTREAM ELEVATION



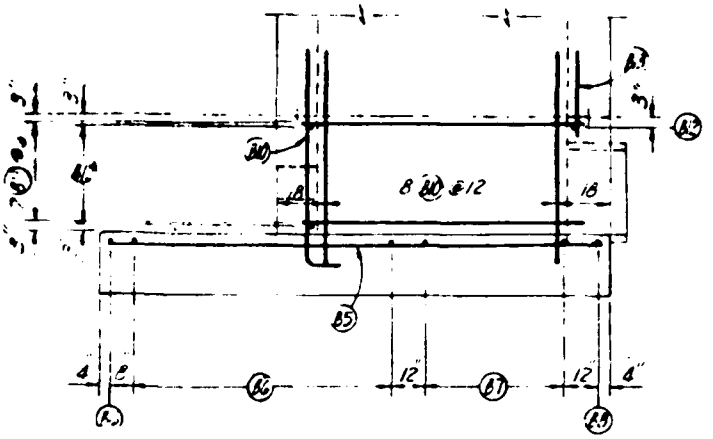


DOWNSTREAM ELEVATION



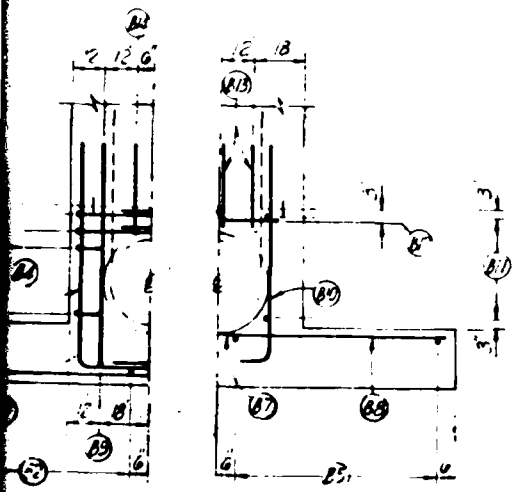
Outside Face Steel 2" From Inside Face

UPSTREAM ELEVATION



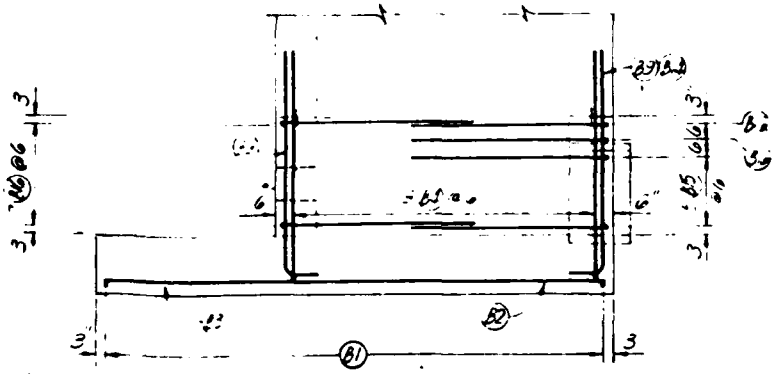
Steel 2" From Inside Face and 2" From Top of Footing

SIDEWALL ELEVATION



Outside Face Steel 2" from Inside Face

DOWNSTREAM ELEVATION



Steel 3" From Outside Face and 3" From Bottom of Footing

SIDEWALL ELEVATION

July 14, 1971

AS BUILT

0 2 4

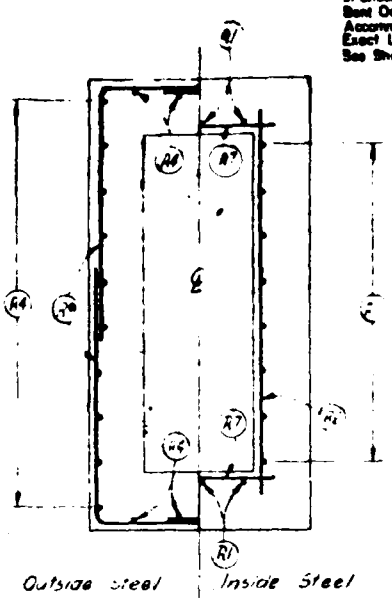
Scale in Feet
Unless Otherwise Shown

CONEWANGO CREEK WATERSHED PROJECT
SITE 1
FLOODWATER RETARDING DAM
CATTARAUGUS COUNTY, NEW YORK
RISER STRUCTURAL DETAILS

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Designed		Date	Approved by
Drawn	D ZOGRAFOS	1-69	Title
Traced			Title
Checked		Sheet No. 11 of 19	Drawing No. NY-255-P

B-12

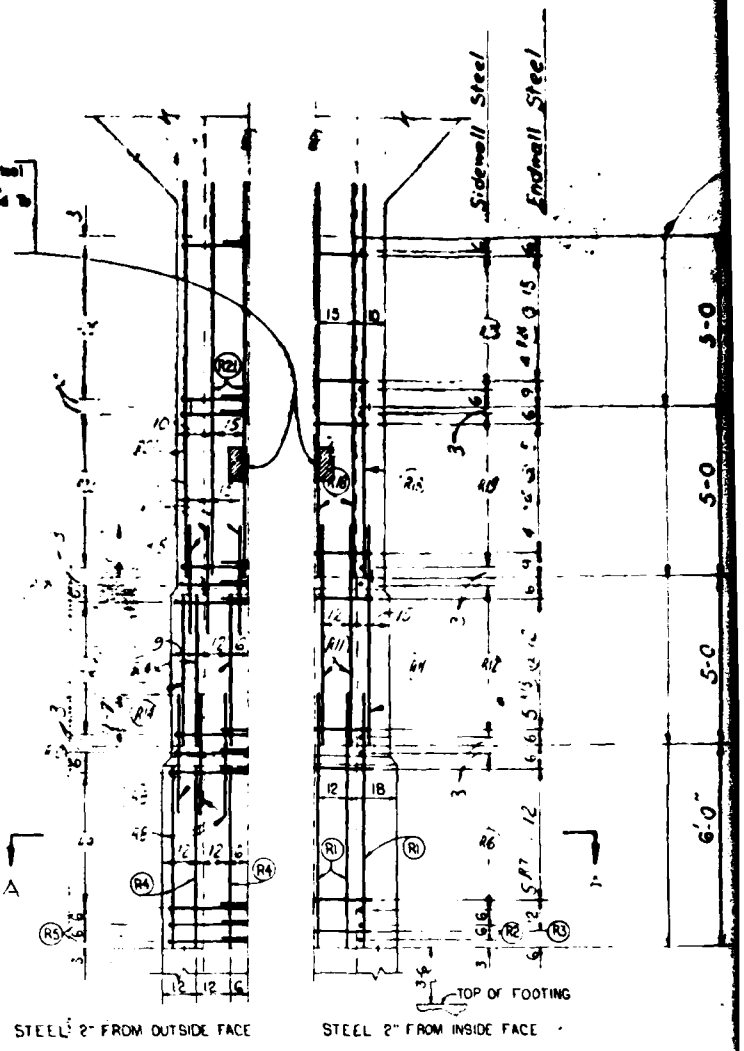


SECTION A-A

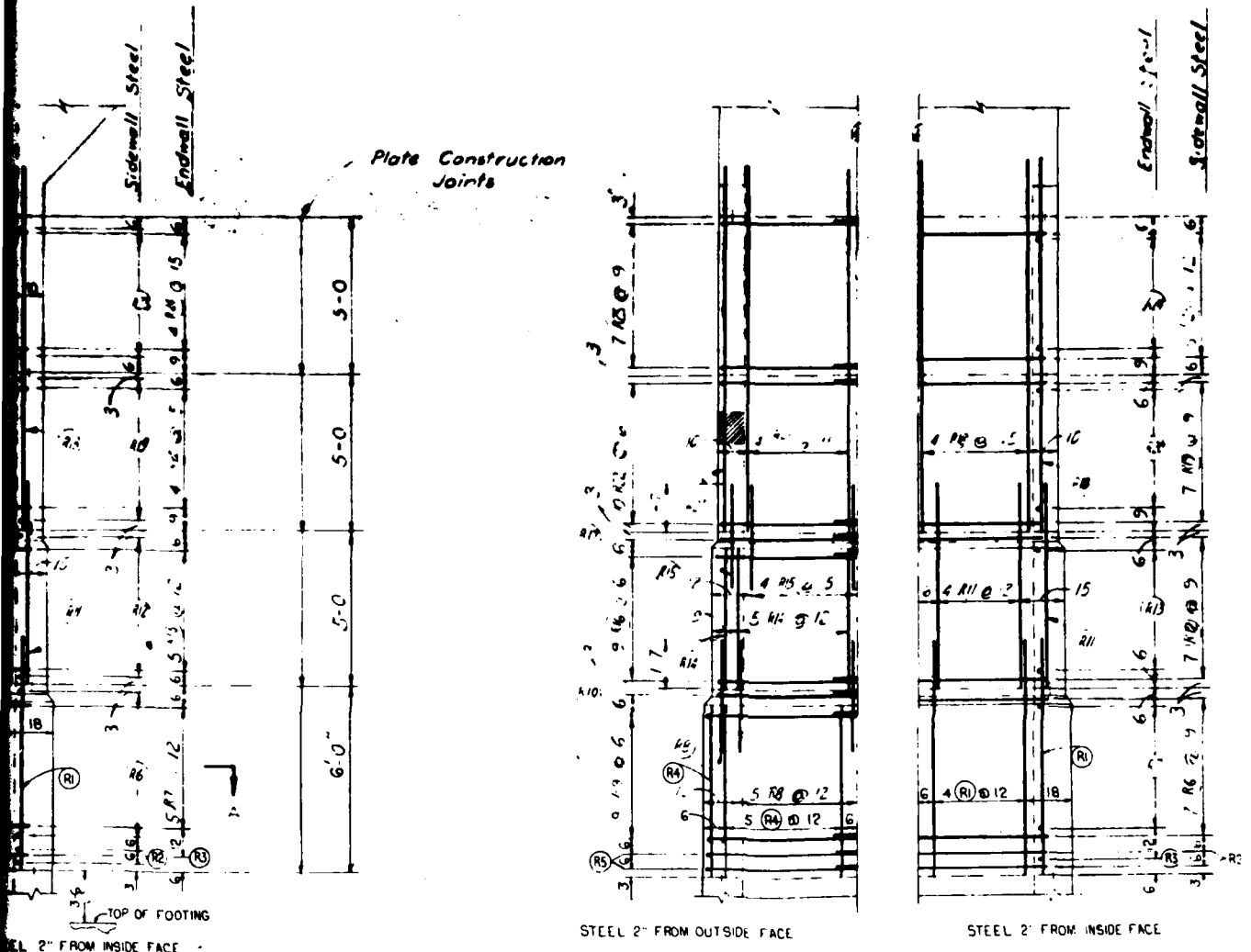
0 1 2 3

Scale: in Feet

As Directed By Engineer, Steel in Shaded Area Will Be Cut, Bent Or Moved As Required To Accommodate Orifice, Per Exact Location Of Orifice See Sheet 9 & 10



ENDWALL ELEVATION



TION

SIDEWALL ELEVATION

July 14, 1971

0 2 4

Scale in Feet

Unless Otherwise Shown

AS BUILT

CONEWANGO CREEK WATERSHED PROJECT
SITE I
FLOODWATER RETARDING DAM
CATTARAUGUS COUNTY, NEW YORK

RISER STRUCTURAL DETAILS

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

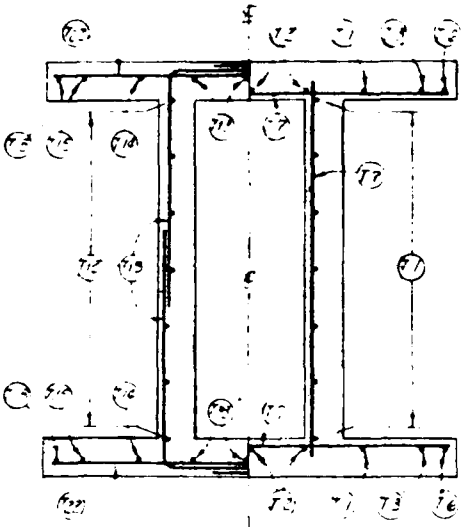
Date

NY-255-P

B-13

1

2

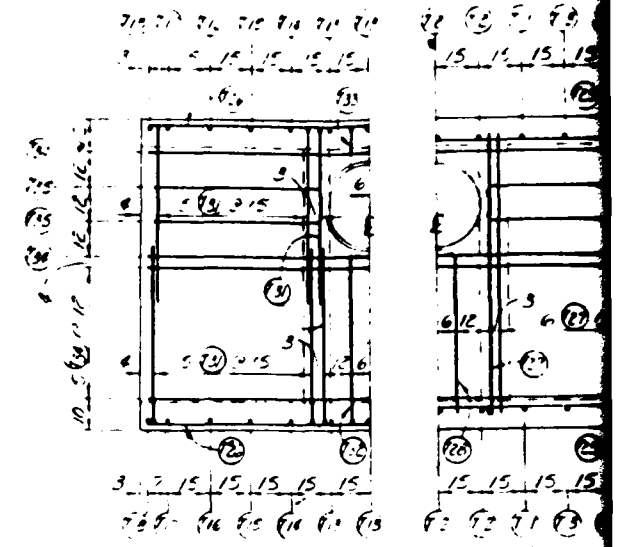


Outside Steel | Inside Steel

SECTION A-A

0 1 2 3

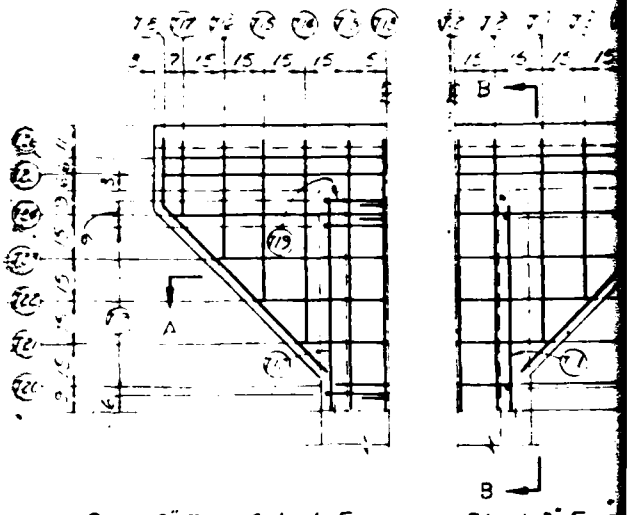
Scale in Feet



Steel 2" From Top of Slab | Steel 2" From

PLAN-COVER SLAP

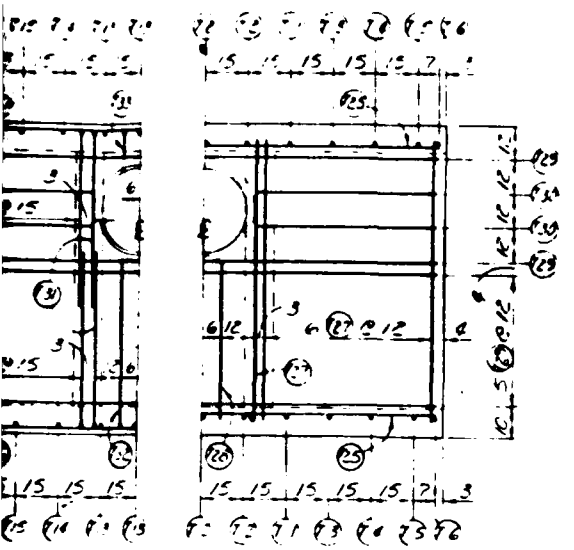
Inner Sidewall Steel Not Shown



Steel 2" From Outside Face | Steel 2" From

END WALL ELEVATION

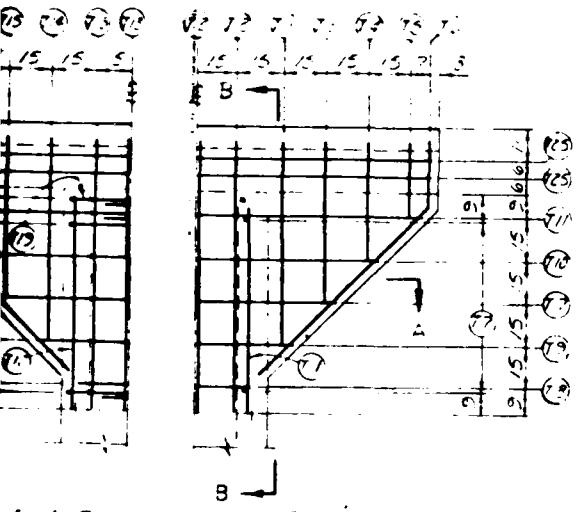
Cover Slab Steel Not Shown



Top of Slab Steel 2" From Bottom of Slab

PLAN-COVER SLAB

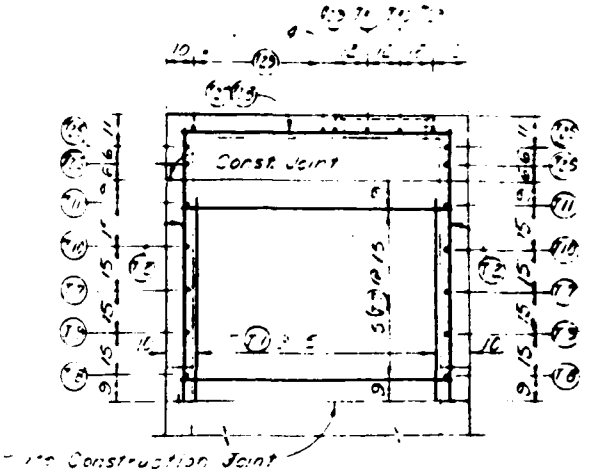
Riser & Headwall Steel Not Shown



Outside Face Steel 2" From Inside Face

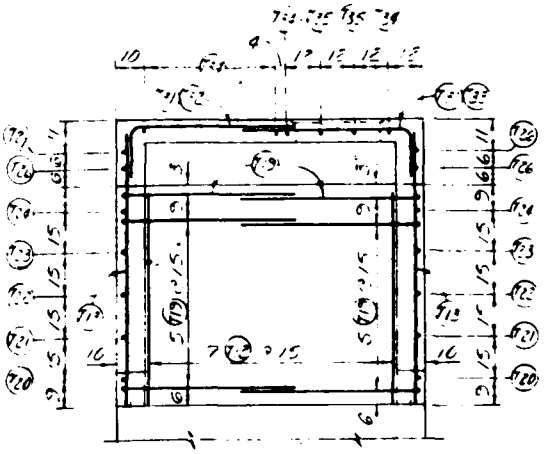
END WALL ELEVATION

Cover Slab Steel Not Shown



Steel 2" From Inside Face

SECTION B-B



Steel 2" From Outside Face

SECTION B-B

July 14, 1971

0 2 4 Scale in Feet

AS BUILT

Unless Otherwise Shown

CONEWANGO CREEK WATERSHED PROJECT
SITE 1
FLOODWATER RETARDING DAM
CATTARAUGUS COUNTY, NEW YORK

RISER STRUCTURAL DETAILS

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Designed D ZOGRAFOS Date 1-69

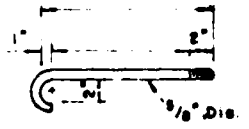
Sheet 13 of 19

NY-2155-P

B-14

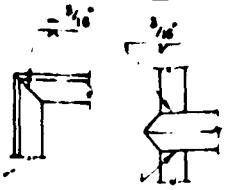
LOW STAGE TRASH RACK BILL OF MATERIALS

ITEM	SIZE	LENGTH	QUANTITY
Angle (A)	2 x 2" x 1/4"	5' - 6"	2
Angle (B)	"	1' - 6"	2
Angle (C)	"	4' - 0"	2
Angle (D)	"	2' - 1 1/2"	2
Angle (E)	"	3' - 7 1/4"	2
Angle (F)	"	3' - 10 3/4"	2
Angle (G)	"	4' - 2 3/8"	7
Angle (H)	"	1' - 7 9/16"	14
Angle (J)	"	2' - 5 3/8"	6
Angle (K)	"	1' - 2 5/16"	2
Angle (L)	"	0' - 8 5/16"	2
"Hook" Bolts	5/8" Dia.	2"	4
Pipe Sleeves	3/4" Dia		4



"HOOK" BOLT

Supply with washer and Type 2 nut



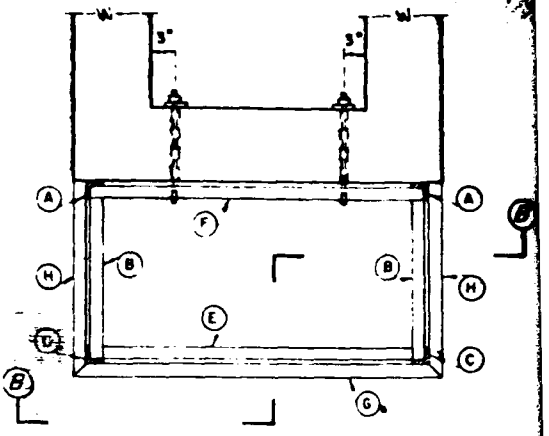
WELDING DETAILS

CONSTRUCTION DETAILS

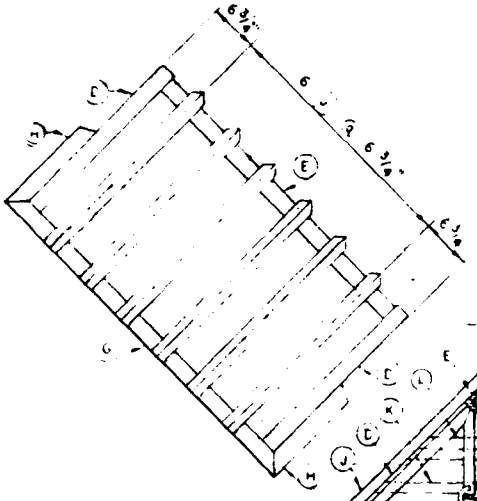
1 All points of contact between angles to be welded.

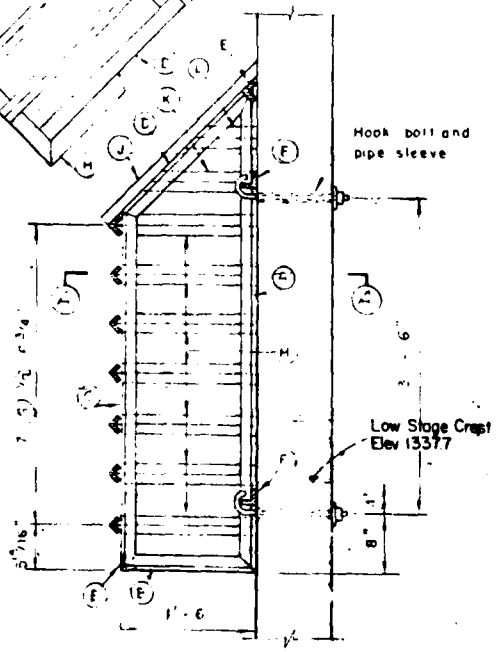
2 Low stage trash rack to be galvanized in accordance with Spec 119. If necessary for galvanizing, trash rack may be fabricated in sections and bolted with the approval of the Engineer.

3 Material in low stage trash rack shall conform to Spec 117 for structural carbon steel plates, shapes and bars.

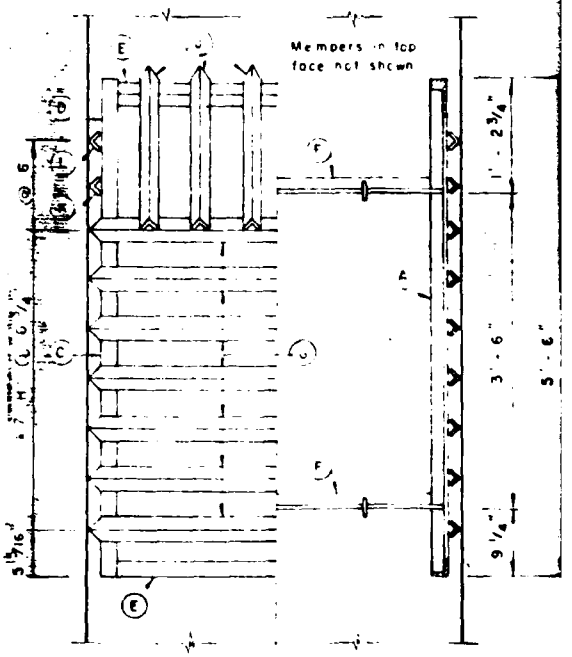


SECTION A A





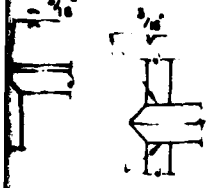
SECTION ON ℄



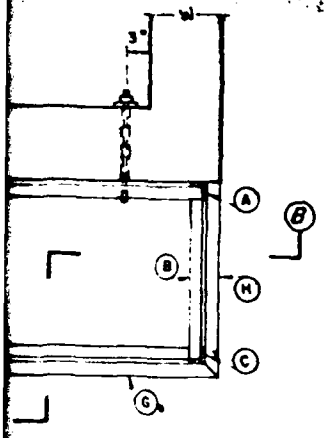
SECTION BB

SCALE

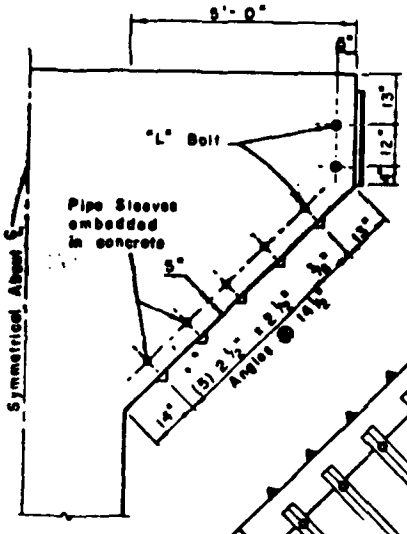
LOW STAGE TRASH RACK DETAILS

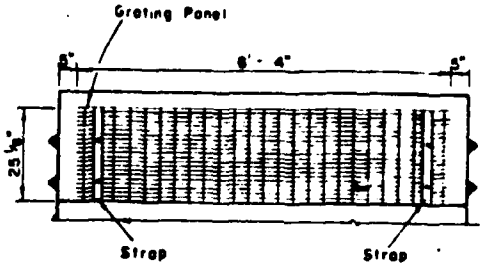


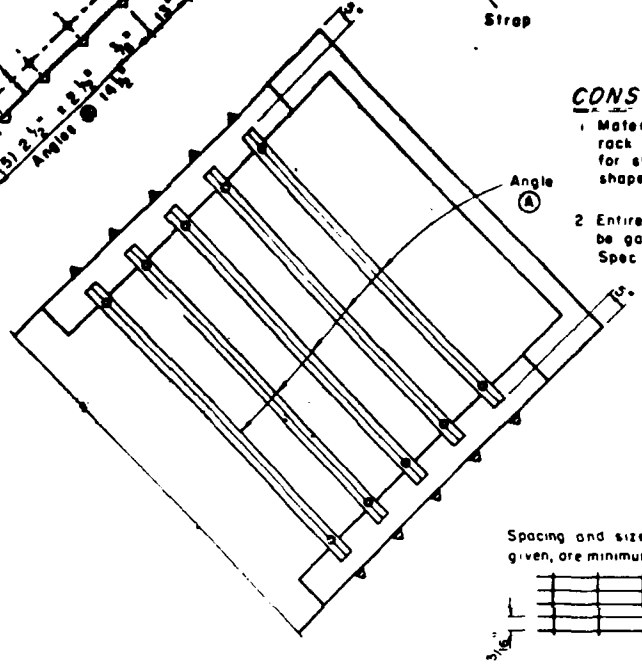
ELDING DETAILS



ON A A

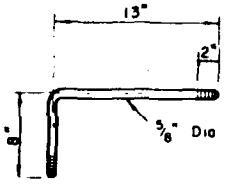






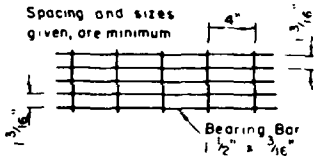
CONSTRUCTION DETAILS

1. Material in high stage trash rack shall conform to Spec 117 for structural carbon steel plates, shapes, and bars.
2. Entire high stage trash rack to be galvanized in accordance with Spec 119

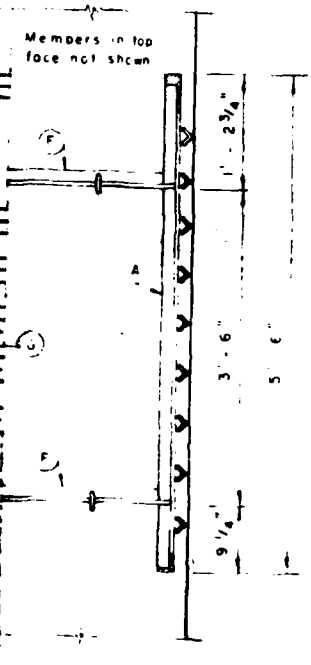


"L" BOLT (Galvanized)

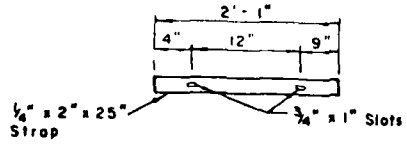
Supply with washers and Type 2 nuts



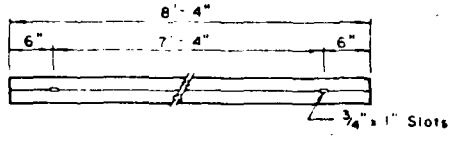
GRATING PANEL



ON BB



STRAP



ANGLE Ⓐ

HIGH STAGE TRASH RACK DETAILS

Scale

July 14, 1971

AS BUILT

HIGH STAGE TRASH RACK BILL OF MATERIALS

ITEM	SIZE	LENGTH	QUANTITY
Angles Ⓐ	2½" x 2½" x ⅜"	8'- 4"	10
Strap	¼" x 2" x 25"	-	4
"L" Bolt	⅝" Dia	8" x 13"	28
Grating Panel	25⅛" x 8'- 4"	-	2
Sleeves	¾" Dia	10"	28

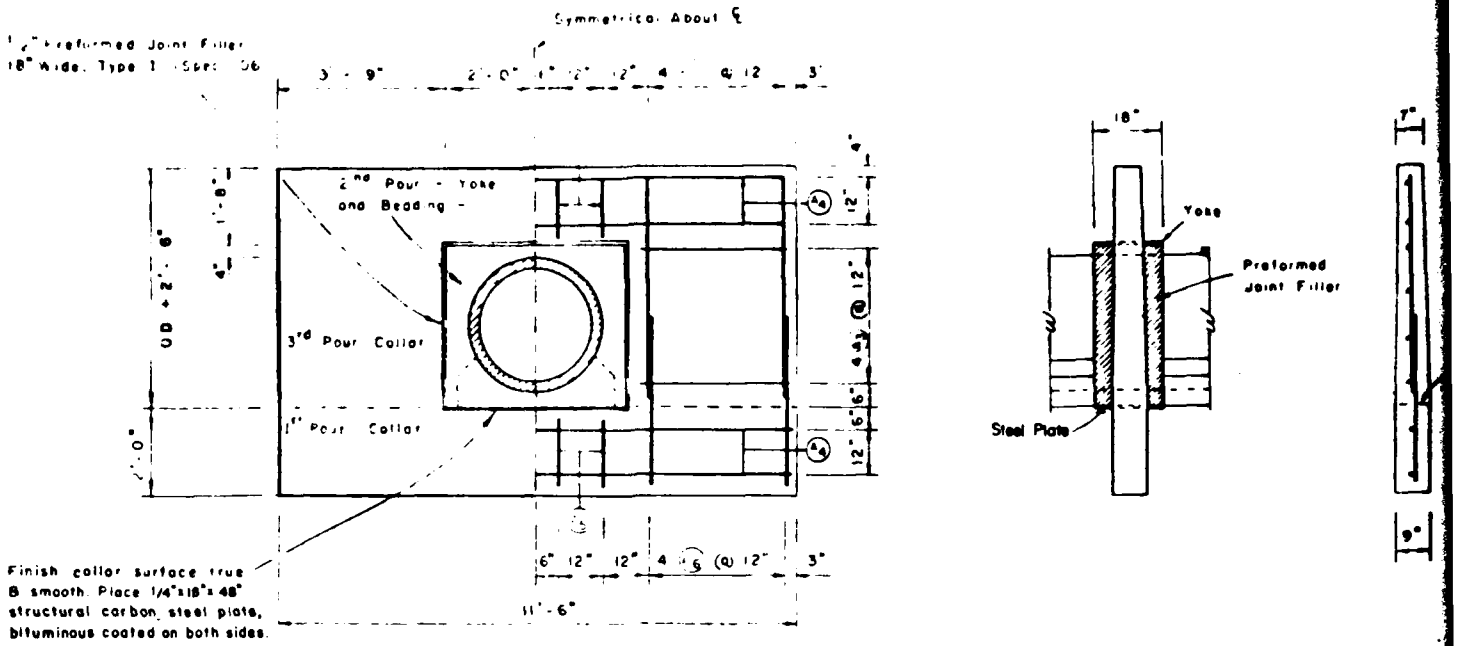
CONEWANGO CREEK WATERSHED
SITE 1
FLOODWATER RETARDING DAM
CATTARAUGUS COUNTY, NY
RISER TRASH RACKS

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Designed D ZOGRAFOS	Date 1/69	Approved	
Drawn W H Morgan		Title	
Traced B L Allen	6/68	Scale	
Checked		Sheet No. 14 of 19	Drawing No. NY-215S-P

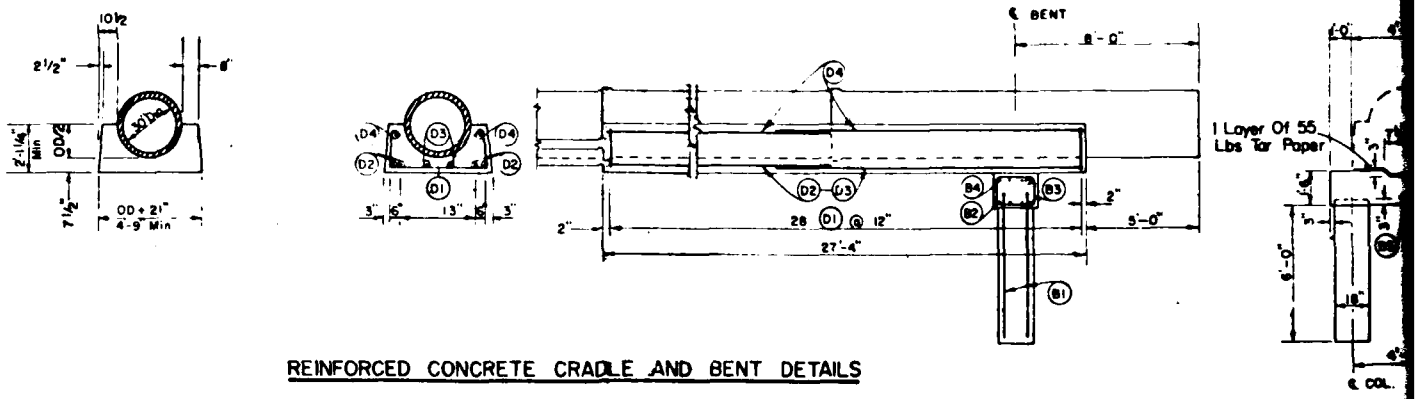
1 2

B-15

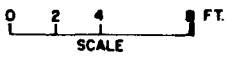


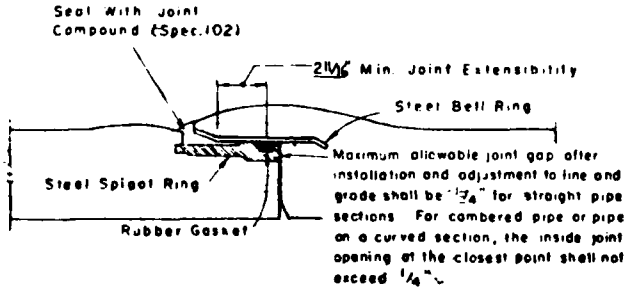
REINFORCED CONCRETE ANTI-SEEP COLLAR

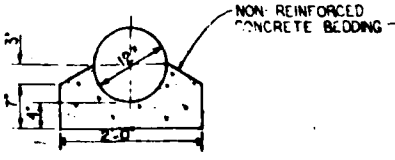
6 - Req'd.



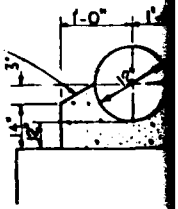
REINFORCED CONCRETE CRADLE AND BENT DETAILS





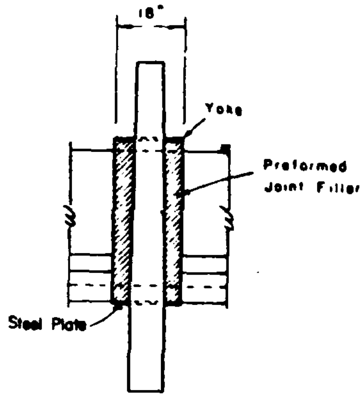


RESERVOIR DRAIN CONCRETE BEDDING
(not to scale)

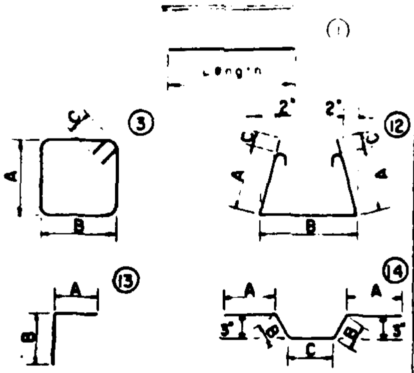


RISER FOOTIN BED
(not to s

REINFORCED CONCRETE PIPE - JOINT DETAILS



BAR TYPE



ANTI-SEEP COLLAR STEEL SCHEDULE

Mark	Size	Length					Total Length
A-1	4			4		~~24~~ 20	~~30-0~~
A-2	4	5-0		8		48	240-0
A-3	4	3-3		8		~~48~~ 40	~~156-0~~
A-4	4	11-0		4		24	264-0
A-5	4	1-6		4		~~24~~ 20	36-0
A-6	4	3-9		8		48	180-0

Mark	Location	Quan	Size	Length	Type	A	B	C	Total Length
B-1	BENT	8	5	7'-0	13	1-0	6-0		56'-0"
B-2		4	8	6'-3"	1				25'-0"
B-3		6	4	6'-4"	3	1-1	1-7	0-6	38'-0"
B-4		4	5	6'-8"	14	2-3	0-4	1-6	26'-8"
B-5		1	4	5'-10"	3	0-10	1-7	0-6	5'-10
D-1	CRADLE	28	4	8'-5"	12	1-8	4-3	0-5	235'-8"
D-2		8	9	14'-11"	1				119'-4"
D-3		4	4	14'-2"	1				56'-8"
D-4		4	7	14'-8"	1				58'-8".

Bars Checked - found to meet Spec - Bars from Republic Steel Corp. Marks June 23 1970
[signature] C. Eng Tech.

QUANTITIES

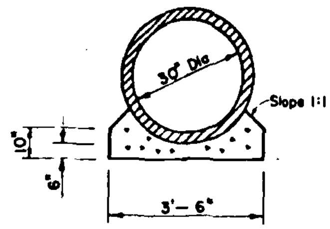
STEEL

No 4 Bar 1242.2 Ft ~~830~~ 729 Lbs
No 5 Bar 82.7 Ft 86 Lbs
No 7 Bar 58.7 Ft 120 Lbs
No 8 Bar 25.0 Ft 67 Lbs
No 9 Bar 119.3 Ft 406 Lbs

Ref: Contract Modification No 1

CONCRETE

REINFORCED ~~22.6~~ 20.2 Cu Yds
NON-REINF. 22.8 Cu Yds

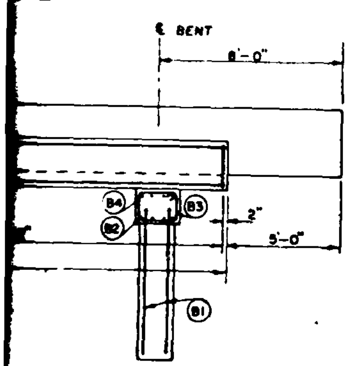


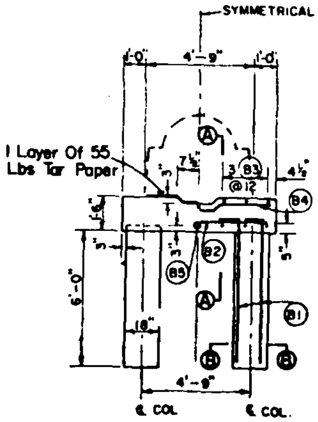
CONSTRUCTION DETAILS SHEET 10

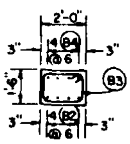
CONCRETE BEDDING

COLLAR

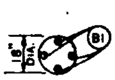
6 - Req'd.



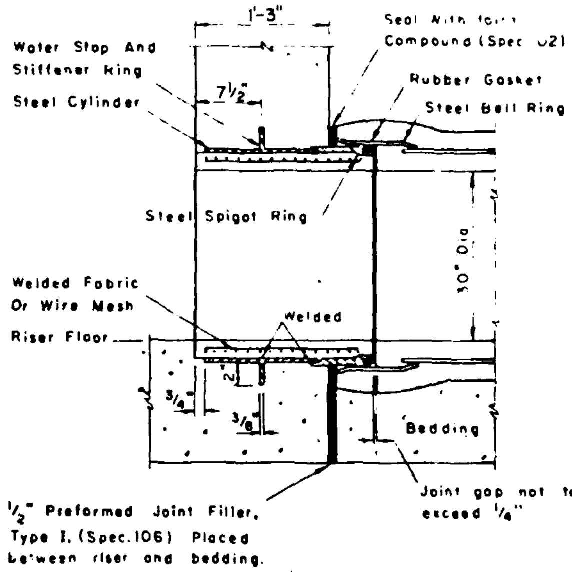




SECT. AA



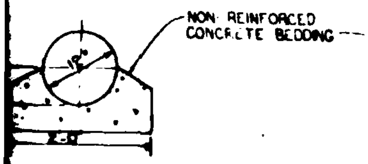
SECT. BB



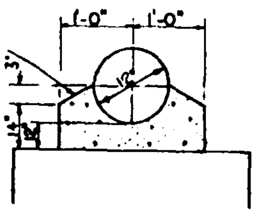
SPIGOT WALL FITTING

July 14, 1970

AS BUILT



...VOIR DRAIN CONCRETE BEDDING
(not to scale)



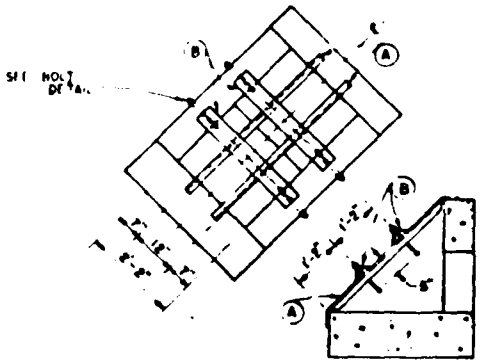
RISER FOOTING CONCRETE BEDDING
(not to scale)

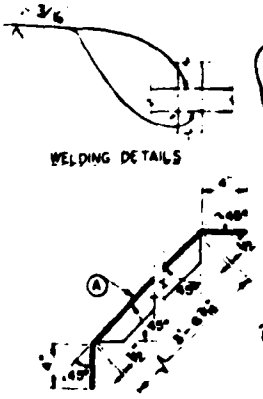
CONEWANGO CREEK WATERSHED PROJECT
SITE 1
FLOODWATER RETARDING DAM
CATTARAUGUS COUNTY, NEW YORK
CONDUIT DETAILS

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Designed D. ZOGRAFOS	Date 12/68	Approved by
Drawn H.T. Browning Jr.	Nov 68	Title
Traced		Title
Checked D.C.Z.	3-69	Sheet No 15 of 18 / Drawing No. NY-2155-P

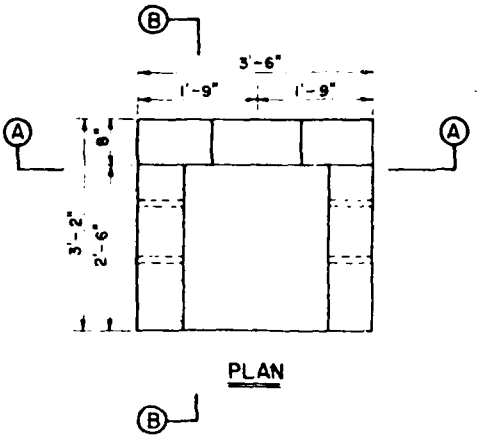
1 2



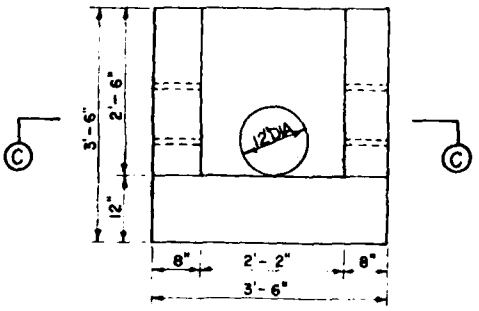


POND DRAIN INLET TRASH RACK DETAILS

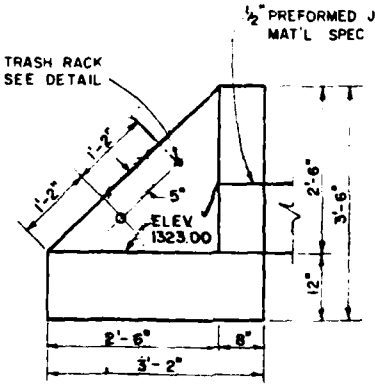
NOT TO SCALE



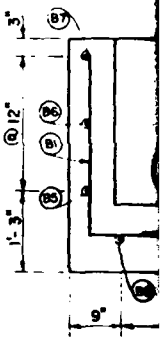
PLAN



UPSTREAM ELEVATION

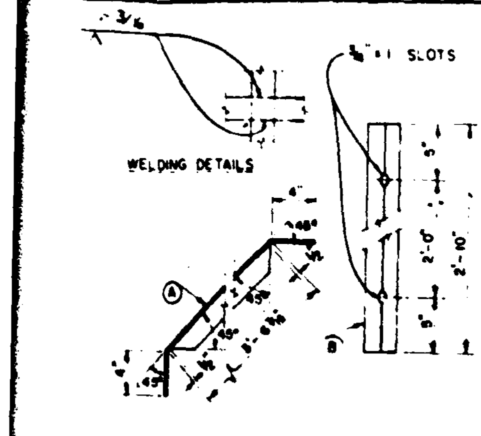


SECTION ALONG ℄



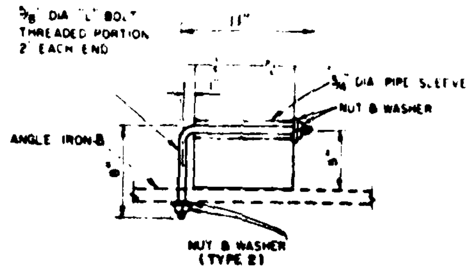
0 3 6 12 24

SCALE IN INCHES



[illegible]T TRASH RACK DETAILS

[illegible]T TO SCALE



BOLT DETAIL GALVANIZED

NOT TO SCALE

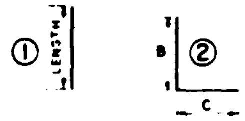
STEEL SCHEDULE

MARK	SIZE	QUAN	LENGTH	TYPE	B	C	TOTAL FT
B-1	4	2	4-10	2	2-9	2-1	967
B-2	4	2	4-2	2	2-1	2-1	833
B-3	4	2	3-5	2	1-4	2-1	684
B-4	4	2	2-10	2	0-9	2-	567
B-5	4	2	3-5	2	2-6	0-11	6.83
B-6	4	2	3 6	2	1-5	2-1	700
B-7	4	2	2-7	2	0 [illegible]	2-1	5 [illegible]
B-8	4	2	5-6	2	2-9	2-9	11 00
B-9	4	1	2-9	1			275

Bars Checked - [illegible] - Republic Steel Corp. Marks - June 28 1971

[illegible signature] [illegible]

BAR TYPES



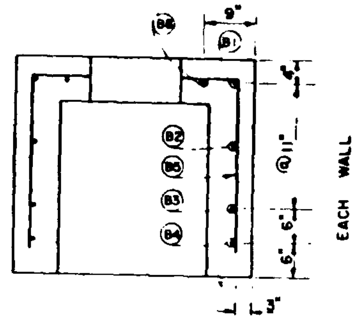
RESERVOIR DRAIN INLET QUANTITIES

STEEL

NO 4 BARS 63.25 LIN FT 42.3 LBS

CONCRETE

REINFORCED 0.9 CU YDS



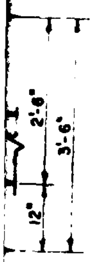
SECTION C-C

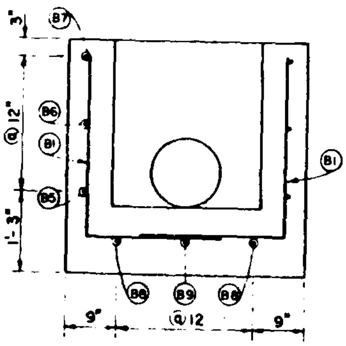
BILL OF MATERIALS

ITEM	SIZE	LENGTH	QUAN
ANGLE IRON (A)	2"x2"x3/16	4'-2 7/16	2
ANGLE IRON (B)	2"x2"x3/16	2'-10"	2
BOLT (GALV.)	5/8 DIA	8"-11"	4
GALV PIPE SLEEVE	3/4" DIA	0'-8"	4

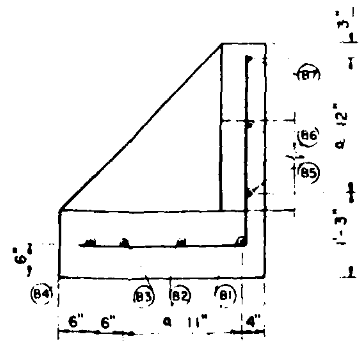
[illegible]EFORMED JOINT FILLER [PREFORMED?]

[illegible]'L SPEC 106 [MAT'L?]





SECTION A-A



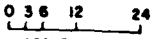
SECTION B-B

CONSTRUCTION DETAILS

1. [illegible] ANGLES TO BE [illegible]
2. MATERIAL IN TRASH RACK SHALL CONFORM TO SPEC [illegible] FOR STRUCTURAL CARBON STEEL PLATES, SHAPES AND BARS.
3. TRASH RACK SHALL BE [illegible] IN ACCORDANCE WITH SPEC 22

July 14, 1971

AS BUILT



SCALE IN INCHES

CONEWANGO CREEK WATERSHED PROJECT
SITE 1
FLOODWATER RETARDING DAM
CATTARAUGUS COUNTY, NEW YORK

RESERVOIR DRAIN INLET DETAILS

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

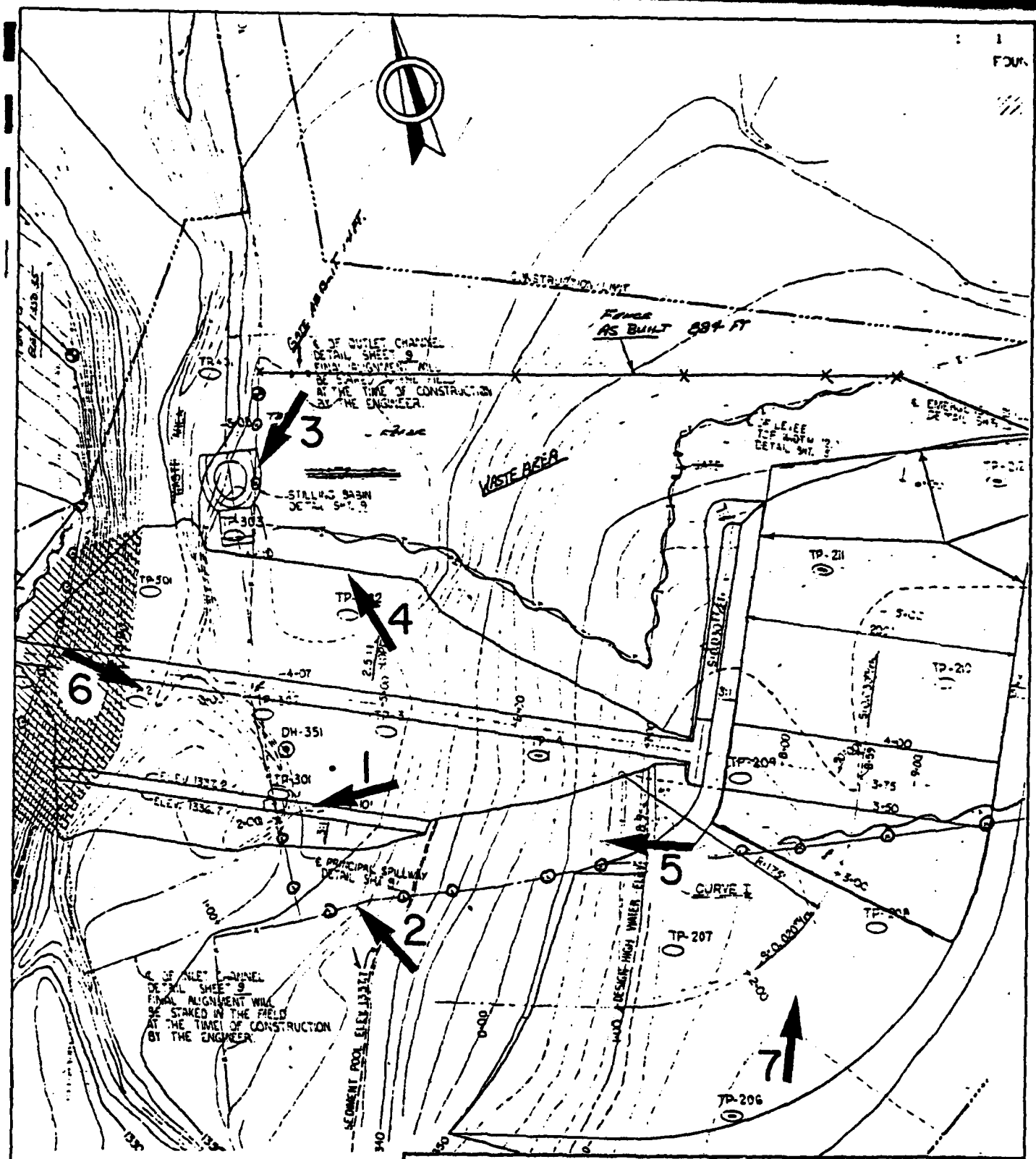
Designed D. ZOGRAFOS 12/68

W E GRAJKO Jr

J.E POLULECH 4/69 16/19 NY-2155-P

APPENDIX C

PHOTOGRAPHS

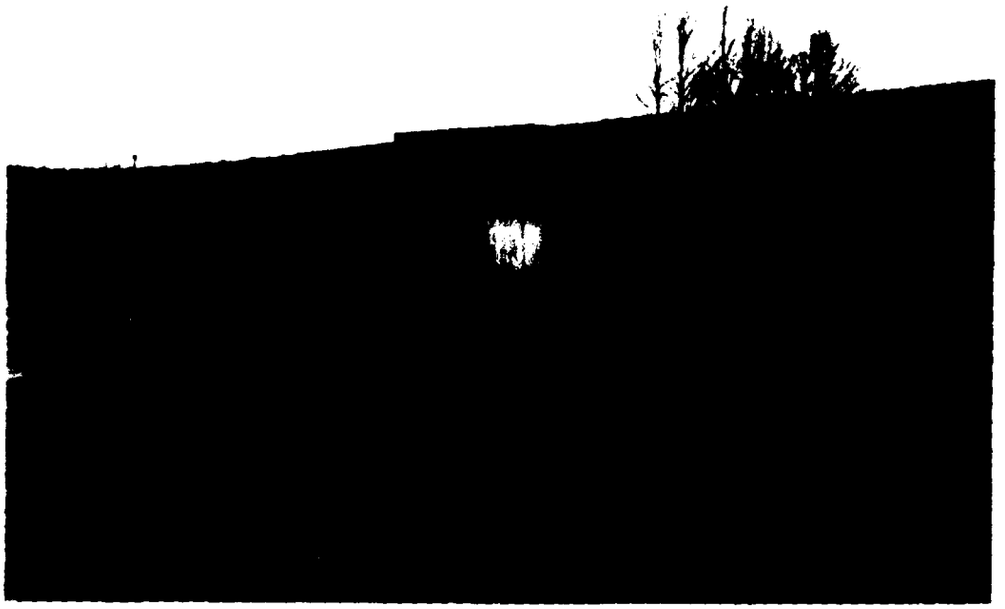


DAVIS BROOK DAM (SITE I)

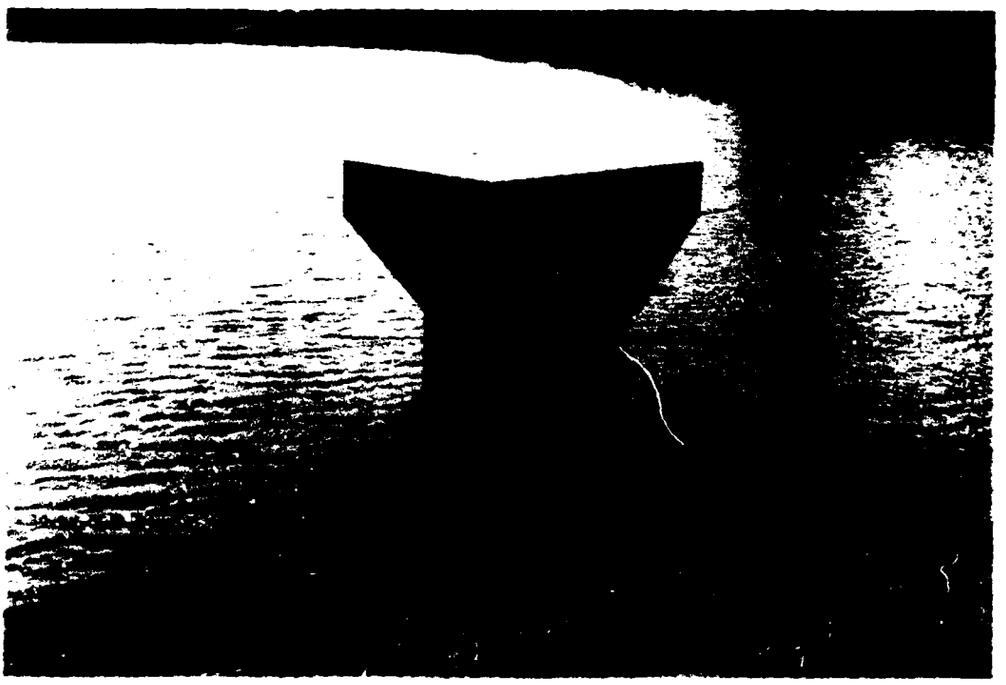
NY00564

PHOTO ORIENTATION PLAN

ENGMAN, ANTHONY, ASSOCIATES CONSULTING ENGINEERS & PLANNERS	DATE MAY 1981	C-1



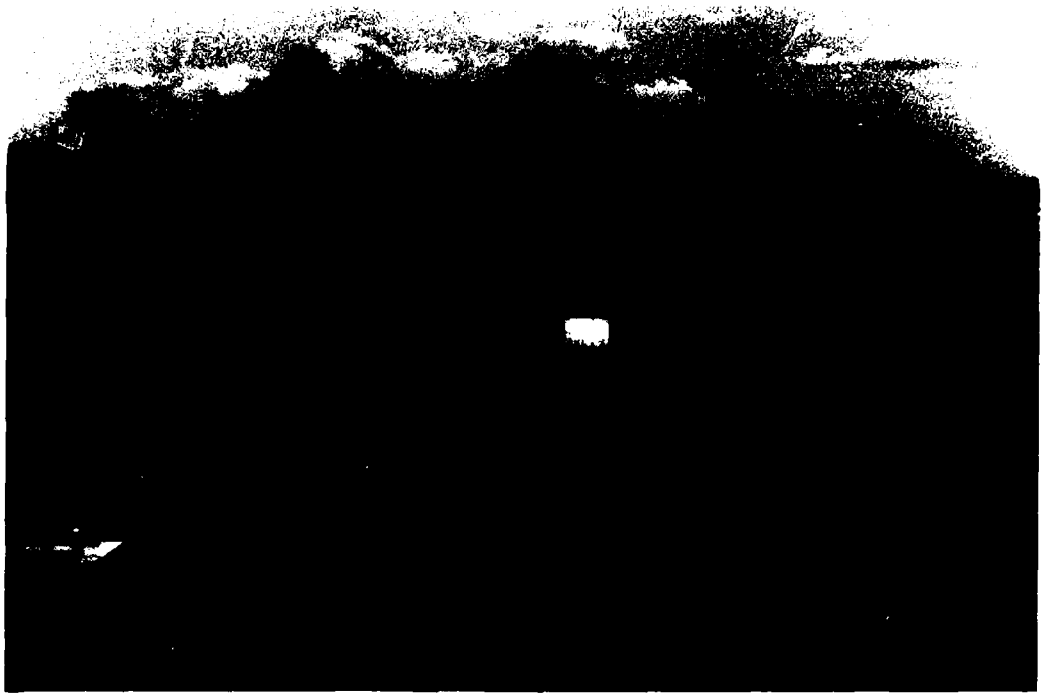
1. Principal spillway inlet structure



2. Principal spillway inlet structure showing low stage inlet and trash rack

3. Principal spillway outlet pipe and plunge pool

4. Plunge pool and downstream channel



5. Upstream face of dam and impoundment

6. Upstream face of dam and emergency spillway

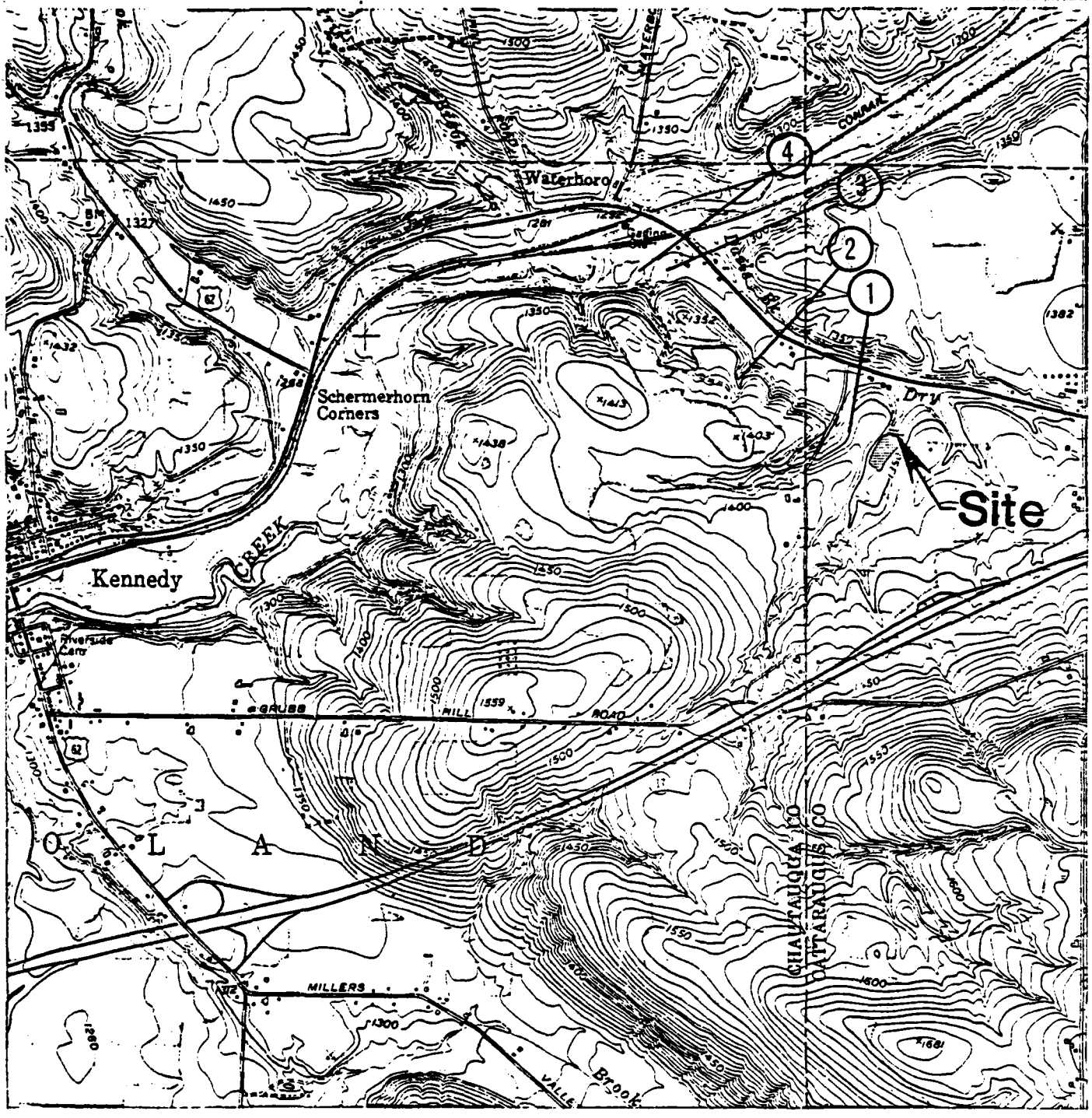
7. Emergency spillway

8. Aerial view

APPENDIX D

HYDRAULIC AND HYDROLOGIC COMPUTATIONS

APPENDIX D



Davis Brook Dam
(Site 1)

CROSS SECTION LOCATION PLAN

Scale: 1"=2000'

D-2

```
A1       ANALYSIS OF DAM OVERTOPPING USING RATIOS OF PMF                    DAM NY 564
A2       HYDROLOGIC-HYDRAULIC ANALYSIS OF SAFETY OF DAVIS BROOK DAM
A3       RATIOS OF PMF ROUTED THROUGH THE RESERVOIR AND DOWNSTREAM
B    100        0       15                                        0      -1        4
B1     5
J      1        6        1
J1   0.2      0.4      0.5      0.6      0.8      1.0
K      0  INFLOW                          0        0        1
K1       CALCULATION OF INFLOW HYDROGRAPH TO RESERVOIR
M      1        1      1.6               1.6        0                                1
P      0     22.8      117      127      141      151
T                                                          1.0      0.1                0
W   3.33     0.63
X    2.0     -.10      2.0
K      1 OUTFLOW                                           1
K1       CALCULATION OF OUTFLOW HYDROGRAPH FROM RESERVOIR
Y                                        1        1
Y1     1                                                  -1351.4      -1
Y4 1337.7   1351.4   1356.8    1358.    1359.    1360.    1361.    1362.    1363.
Y5     0      23.      126.     960.    2201.    3805.    5687.    7876.   10270.
$S  23.3     85.8    174.8    213.5    273.0
$E 1337.7   1351.4   1356.8   1358.9   1361.6
$$ 1356.8
$D 1361.6      2.7      1.5    564.6
K      1        1                                           1
K1     CHANNEL ROUTING -MOD PULS RESERVOIR -1
Y                                        1        1
Y1     1
Y6  .045      .05     .045     1298     1350     1600   0.0400
Y7     0     1350      400     1320    742.5     1305    752.5     1298    772.5     1298
Y7 782.5     1305      950     1320     1025     1350
K      1        2                                           1
K1     CHANNEL ROUTING -MOD PULS REACH 1-2
Y                                        1        1
Y1     1
Y6  .075      .05     .075     1287     1310     1100   0.0100
Y7     0     1310      100     1300      582     1294      597     1287      617     1287
Y7   632     1294      700     1300      890     1310
K      1        3                                           1
K1     CHANNEL ROUTING -MOD PULS REACH 2-3
Y                                        1        1
Y1     1
Y6  .075      .05     .075     1262     1275     1700   0.0150
Y7     0     1275      300     1270      700     1269      715     1262      735     1262
Y7   750     1269      850     1270      950     1275
K      1        4                                           1
K1     CHANNEL ROUTING -MOD PULS REACH 3-4
Y                                        1        1
Y1     1
Y6  .045      .05     .045     1255     1270      475   0.0150
Y7     0     1270      265     1260      215     1255      245     1255      255     1260
Y7   300     1270      301     1270      320     1270
K     99
```

```
OK, SEG #HEC1DB


OK, SEG #HEC1DB
ENTER PROJECT NUMBER
80166-80.04
INPUT FILE ? NY564
1**********************************
 FLOOD HYDROGRAPH PACKAGE (HEC-1)
 DAM SAFETY VERSION     JULY 1978
   LAST MODIFICATION  26 FEB 79
 **********************************
1                          PREVIEW OF SEQUENCE OF STREAM NETWORK CALCULATIONS
                                 RUNOFF HYDROGRAPH AT      INFLOW
                                 ROUTE HYDROGRAPH TO       UTFLOW
                                 ROUTE HYDROGRAPH TO            1
                                 ROUTE HYDROGRAPH TO            2
                                 ROUTE HYDROGRAPH TO            3
                                 ROUTE HYDROGRAPH TO            4
                                 END OF NETWORK


1**********************************
 FLOOD HYDROGRAPH PACKAGE (HEC-1)
 DAM SAFETY VERSION     JULY 1978
   LAST MODIFICATION  26 FEB 79
 **********************************

 RUN  DATE: 4/28/
      TIME: 8:28 AM
```

D-4

ANALYSIS OF DAM OVERTOPPING USING RATIOS OF PMF — DAM NY 564
HYDROLOGIC-HYDRAULIC ANALYSIS OF SAFETY OF DAVIS BROOK DAM
RATIOS OF PMF ROUTED THROUGH THE RESERVOIR AND DOWNSTREAM

JOB SPECIFICATION

NQ	NHR	NMIN	IDAY	IHR	IMIN	METRC	IPLT	IPRT	NSTAN
100	0	15	0	0	0	0	-1	4	0
			JOPER	NWT	LROPT	TRACE			
			5	0	0	0			

MULTI-PLAN ANALYSES TO BE PERFORMED
NPLAN= 1 NRTIO= 6 LRTIO= 1

RTIOS= 0.20 0.40 0.50 0.60 0.80 1.00

********** ********** ********** ********** **********

SUB-AREA RUNOFF COMPUTATION

CALCULATION OF INFLOW HYDROGRAPH TO RESERVOIR

	ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
INFLOW	0	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUNG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	1	1.60	0.00	1.60	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	22.80	117.00	127.00	141.00	151.00	0.00	0.00

ASPC COMPUTED BY THE PROGRAM IS 0.800

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	1.00	0.10	0.00	0.00

UNIT HYDROGRAPH DATA

TP= 3.33 CP=0.63 NTA= 0

RECESSION DATA

STRTQ= 2.00 QRCSN= -0.10 RTIOR= 2.00

UNIT HYDROGRAPH 73 END-OF-PERIOD ORDINATES, LAG= 3.32 HOURS, CP= 0.63 , VOL= 1.00

4.	16.	32.	51.	71.	93.	116.	139.	160.	177.
189.	198.	202.	201.	194.	180.	166.	153.	141.	130.
119.	110.	101.	93.	86.	79.	73.	67.	62.	57.
53.	48.	45.	41.	38.	35.	32.	30.	27.	25.
23.	21.	20.	18.	17.	15.	14.	13.	12.	11.
10.	9.	9.	8.	7.	7.	6.	6.	5.	5.
4.	4.	4.	3.	3.	3.	3.	3.	2.	2.
2.	2.	2.							

0

END-OF-PERIOD FLOW

MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
									SUM	27.54	23.79	3.75	85971.
										(700.)	(604.)	(95.)	(2434.43)

********** ********** ********** ********** **********

HYDROGRAPH ROUTING

CALCULATION OF OUTFLOW HYDROGRAPH FROM RESERVOIR

	ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
OUTFLOW	1	0	0	0	0	1	0	0	

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	1	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	-1351.	-1

STAGE	1337.70	1351.40	1356.80	1358.00	1359.00	1360.00	1361.00	1362.00	1363.00
FLOW	0.00	23.00	126.00	960.00	2201.00	3805.00	5687.00	7876.00	10270.00
CAPACITY=		23.	86.	175.	214.	273.			
ELEVATION=		1338.	1351.	1357.	1359.	1362.			

CREL	SPWID	COOW	EXPW	ELEVL	COOL	CAREA	EXPL
1356.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0

DAM DATA

TOPEL	CQQD	EXPD	DAMWID
1361.6	2.7	1.5	565.

PEAK OUTFLOW IS. 621. AT TIME 43.50 HOURS

PEAK OUTFLOW IS 1301. AT TIME 43.00 HOURS

PEAK OUTFLOW IS 1626. AT TIME 43.00 HOURS

PEAK OUTFLOW IS 1951. AT TIME 43.00 HOURS

PEAK OUTFLOW IS 2604. AT TIME 43.00 HOURS

PEAK OUTFLOW IS 3254. AT TIME 43.00 HOURS

********** ********** ********** ********** **********

HYDROGRAPH ROUTING.

CHANNEL ROUTING -MOD PULS RESERVOIR -1

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
1	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	1	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	0.	0

NORMAL DEPTH CHANNEL ROUTING

QN(1)	QN(2)	QN(3)	ELNVT	ELMAX	RLNTH	SEL
0.0450	0.0500	0.0450	1298.0	1350.0	1600.	0.04000

CROSS SECTION COORDINATES--STA,ELEV,STA,ELEV--ETC

0.00 1350.00 400.00 1320.00 742.50 1305.00 752.50 1298.00 772.50 1298.00
782.50 1305.00 950.00 1320.00 1025.00 1350.00

STORAGE	0.00	2.40	5.59	10.41	23.24	45.43	76.97	117.87	169.12	229.42
	287.08	353.09	423.45	498.18	577.26	660.69	748.49	840.63	937.14	1038.00
OUTFLOW	0.00	662.66	2246.87	5100.31	11732.69	25084.71	47587.94	81348.67	128278.72	195476.38
	277066.00	372978.56	483500.00	608981.50	749814.63	906415.88	1079216.75	1268658.25	1475188.50	1699257.00
STAGE	1298.00	1300.74	1303.47	1306.21	1308.95	1311.68	1314.42	1317.16	1319.89	1322.63
	1325.37	1328.10	1330.84	1333.58	1336.32	1339.05	1341.79	1344.53	1347.26	1350.00
FLOW	0.00	662.66	2246.87	5100.31	11732.69	25084.71	47587.94	81348.67	128278.72	195476.38
	277066.00	372978.56	483500.00	608981.50	749814.63	906415.88	1079216.75	1268658.25	1475188.50	1699257.00

MAXIMUM STAGE IS 1300.6

MAXIMUM STAGE IS 1301.8

MAXIMUM STAGE IS 1302.4

MAXIMUM STAGE IS 1303.0

MAXIMUM STAGE IS 1303.8

MAXIMUM STAGE IS 1304.4

********** ********** ********** ********** **********

HYDROGRAPH ROUTING

CHANNEL ROUTING -MOD PULS REACH 1-2

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
2	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	1	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	0	0

NORMAL DEPTH CHANNEL ROUTING

QN(1)	QN(2)	QN(3)	ELNVT	ELMAX	RLNTH	SEL
0.0750	0.0500	0.0750	1287.0	1310.0	1100.	0.01000

CROSS SECTION COORDINATES--STA,ELEV,STA,ELEV--ETC

0.00 1310.00 100.00 1300.00 582.00 1294.00 597.00 1287.00 617.00 1287.00
632.00 1294.00 700.00 1300.00 890.00 1310.00

STORAGE	0.00	0.69	1.54	2.55	3.71	5.04	6.60	10.56	17.91	28.65
	42.79	60.24	79.39	99.62	120.92	143.30	166.75	191.27	216.86	242.53
OUTFLOW	0.00	84.89	282.54	584.92	996.47	1524.14	2208.94	3296.75	4987.28	7514.82
	11077.87	16017.80	22733.38	30727.40	39976.66	50474.09	62221.90	75228.27	89505.47	105061.61
STAGE	1287.00	1288.21	1289.42	1290.63	1291.84	1293.05	1294.26	1295.47	1296.68	1297.89
	1299.10	1300.31	1301.53	1302.74	1303.95	1305.16	1306.37	1307.58	1308.79	1310.00
FLOW	0.00	84.89	282.54	584.92	996.47	1524.14	2208.94	3296.75	4987.28	7514.82
	11077.87	16017.80	22733.38	30727.40	39976.66	50474.09	62221.90	75228.27	89505.47	105061.61

MAXIMUM STAGE IS 1290.7

MAXIMUM STAGE IS 1292.5

MAXIMUM STAGE IS 1293.2

MAXIMUM STAGE IS 1293.8

MAXIMUM STAGE IS 1294.7

MAXIMUM STAGE IS 1295.4

********** ********** ********** ********** **********

HYDROGRAPH ROUTING

CHANNEL ROUTING -MOD PULS REACH 2-3

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
3	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	1	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	0.	0

NORMAL DEPTH CHANNEL ROUTING

ON(1)	ON(2)	ON(3)	ELNVT	ELMAX	RLNTH	SEL
0.0750	0.0500	0.0750	1262.0	1275.0	1700.	0.01500

CROSS SECTION COORDINATES--STA,ELEV,STA,ELEV--ETC

0.00 1275.00 300.00 1270.00 700.00 1269.00 715.00 1262.00 735.00 1262.00
750.00 1269.00 850.00 1270.00 950.00 1275.00

STORAGE	0.00	0.57	1.22	1.95	2.76	3.65	4.61	5.66	6.78	[illegible]98
	9.25	13.27	25.82	41.68	59.01	77.79	98.03	119.74	142.98	167.53
OUTFLOW	0.00	39.47	128.25	258.82	430.06	642.43	897.04	1195.33	1538.90	1925.44
	2368.67	3004.79	4255.19	6355.04	9136.22	12574.61	16668.92	21427.97	26865.85	32995.66
STAGE	1262.00	1262.68	1263.37	1264.05	1264.74	1265.42	1266.10	1266.79	1267.47	1268.16
	1268.84	1269.52	1270.21	1270.89	1271.58	1272.26	1272.95	1273.63	1274.31	1275.00
FLOW	0.00	39.47	128.25	258.82	430.06	642.43	897.04	1195.33	1538.98	1925.44
	2368.67	3004.79	4255.19	6355.04	9136.22	12574.61	16668.92	21427.97	26865.85	32995.66

MAXIMUM STAGE IS 1265.4

MAXIMUM STAGE IS 1267.0

MAXIMUM STAGE IS 1267.6

MAXIMUM STAGE IS 1268.2

MAXIMUM STAGE IS 1269.1

MAXIMUM STAGE IS 1269.7

********** *********** *********** *********** **********

HYDROGRAPH ROUTING

CHANNEL ROUTING -MOD PULS REACH 3-4

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
4	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	1	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	0.	0

NORMAL DEPTH CHANNEL ROUTING

QN(1)	QN(2)	QN(3)	ELNVT	ELMAX	RLNTH	SEL
0.0450	0.0500	0.0450	1255.0	1270.0	475.	0.01500

CROSS SECTION COORDINATES--STA,ELEV,STA,ELEV--ETC

0.00 1270.00 205.00 1260.00 215.00 1255.00 245.00 1255.00 255.00 1260.00
300.00 1270.00 301.00 1270.00 320.00 1270.00

STORAGE	0.00	0.27	0.57	0.90	1.25	1.63	2.04	2.50	3.13	1.93
	4.90	6.04	7.34	8.82	10.47	12.29	14.27	16.43	18.76	21.25
OUTFLOW	0.00	75.46	245.02	492.71	814.36	1208.78	1676.19	2135.11	2729.87	3505.74
	4489.36	5708.04	7189.16	8958.86	11042.13	13462.91	16244.30	19408.60	22977.48	26971.96
STAGE	1255.00	1255.79	1256.58	1257.37	1258.16	1258.95	1259.74	1260.53	1261.31	1262.10
	1262.89	1263.68	1264.47	1265.26	1266.05	1266.84	1267.63	1268.42	1269.21	1270.00
FLOW	0.00	75.46	245.02	492.71	814.36	1208.78	1676.19	2135.11	2729.87	3505.74
	4489.36	5708.04	7189.16	8958.86	11042.13	13462.91	16244.30	19408.60	22977.48	26971.96

MAXIMUM STAGE IS 1257.7

MAXIMUM STAGE IS 1259.1

MAXIMUM STAGE IS 1259.6

MAXIMUM STAGE IS 1260.2

MAXIMUM STAGE IS 1261.1

MAXIMUM STAGE IS 1261.8

1

PEAK FLOW AND STORAGE (END OF PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND (CUBIC METERS PER SECOND)
AREA IN SQUARE MILES (SQUARE KILOMETERS)

OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO FLOWS RATIO 1	RATIO 2	RATIO 3	RATIO 4	RATIO 5	RATIO 6
				0.20	0.40	0.50	0.60	0.80	1.00
HYDROGRAPH AT	INFLOW	1.60	1	652.	1305.	1631.	1957.	2609.	3261.
		(4.14)		(18.47)(	36.94)(	46.17)(	55.41)(	73.88)(	92.35)(
ROUTED TO	OUTFLOW	1.60	1	621.	1301.	1626.	1951.	2604.	3254.
		(4.14)		(17.58)(	36.84)(	46.04)(	55.25)(	73.72)(	92.15)(
ROUTED TO	1	1.60	1	623.	1300.	1625.	1951.	2602.	3254.
		(4.14)		(17.64)(	36.80)(	46.03)(	55.23)(	73.69)(	92.14)(
ROUTED TO	2	1.60	1	619.	1302.	1626.	1949.	2602.	3251.
		(4.14)		(17.53)(	36.86)(	46.03)(	55.18)(	73.67)(	92.07)(
ROUTED TO	3	1.60	1	622.	1298.	1623.	1948.	2598.	3246.
		(4.14)		(17.60)(	36.76)(	45.94)(	55.16)(	73.56)(	91.93)(
ROUTED TO	4	1.60	1	622.	1300.	1624.	1948.	2597.	3246.
		(4.14)		(17.61)(	36.81)(	45.98)(	55.15)(	73.55)(	91.92)(

1 SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	1351.40	1356.80	1361.60
STORAGE	86.	175.	273.
OUTFLOW	23.	126.	7008.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
0.20	1357.51	0.00	188.	621.	0.00	43.50	0.00
0.40	1358.27	0.00	202.	1301.	0.00	43.00	0.00
0.50	1358.54	0.00	207.	1626.	0.00	43.00	0.00
0.60	1358.80	0.00	212.	1951.	0.00	43.00	0.00
0.80	1359.25	0.00	221.	2604.	0.00	43.00	0.00
1.00	1359.66	0.00	230.	3254.	0.00	43.00	0.00

PLAN 1 STATION 1

MAXIMUM MAXIMUM TIME

RATIO	FLOW,CFS	STAGE,FT	HOURS
0.20	623.	1300.6	43.50
0.40	1300.	1301.8	43.00
0.50	1625.	1302.4	43.00
0.60	1951.	1303.0	43.00
0.80	2602.	1303.8	43.00
1.00	3254.	1304.4	43.00

PLAN 1 STATION 2

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
0.20	619.	1290.7	43.50
0.40	1302.	1292.5	43.00
0.50	1626.	1293.2	43.00
0.60	1949.	1293.8	43.00
0.80	2602.	1294.7	43.00
1.00	3251.	1295.4	43.00

PLAN 1 STATION 3

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
0.20	622.	1265.4	43.75
0.40	1298.	1267.0	43.25
0.50	1623.	1267.6	43.25
0.60	1948.	1268.2	43.00
0.80	2598.	1269.1	43.25
1.00	3246.	1269.7	43.25

PLAN 1 STATION 4

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
0.20	622.	1257.7	43.75
0.40	1300.	1259.1	43.25
0.50	1624.	1259.6	43.25
0.60	1948.	1260.2	43.00
0.80	2597.	1261.1	43.25
1.00	3246.	1261.8	43.25

BY DATE ERDMAN, ANTHONY, ASSOCIATES SHEET 1 OF 2

CHKD B.R. DATE 3/16/81 SUBJECT DAM 564 HYDROLOGY SUB-SHEET NO. 1

OWNER PROJECT NAME HEC-1DB DAM INSPECTION 80166-00.05

DAM 564 DAVIS BROOK DAM REFF. QUAD. KENNEDY, N.Y.

DISTANCE L & Lca MEASURED BY MAP MEASURING WHEEL (1" = 2000')

COMPUTATIONS FOR L DISTANCE

RUN	MEAS. DIST.	AVG. DIST.	COEF	L- DISTANCE
A	1 = 7.9"			
	2 = 8.0"			
	15.9"	÷ 2 = 7.95"	× 2000'	= 15900 FT. *

* L = 15900 FT

COMPUTATIONS FO Lca DISTANCE

RUN	MEAS. DIST.	AVG DIST.	COEF.	Lca DISTANCE
A	1 = 4.3"			
	2 = 4.4"			
	8.7"	÷ 2 = 4.35"	× 2000'	= 8700 FT. *

* Lca = 8700 FT.

$$T_p = C_t (L L_{ca})^{0.3}, \qquad C_t = 2.00, \quad C_p = 0.63$$

$$T_r = \frac{T_p}{5.5}$$

$$T_{pR} = T_p + 0.25 (T_R - T_r)$$

$L = 15900' = 3.01$ mi

$L_{ca} = 8700' = 1.65$ mi

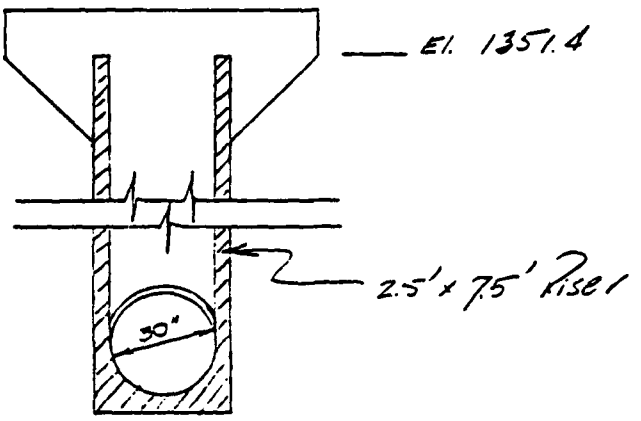
$T_p = 2 (3.01 \times 1.65)^{.3} = 3.23$ hr. ✓

$T_r = \frac{3.23}{5.5} = 0.59$ ✓ hr $\Longrightarrow T_R = 1.0$ ✓ hr.

$T_{pR} = 3.23 + .25(1 - 0.59) = 3.33$ ✓ hr.

Service Spillway

Assume that the 30" RCP is the control & develop an eqtn. of the form $Q = CA\sqrt{2gH}$ to describe the flow.



From Design Report

Q_s = 23 cfs @ El. 1351.4

Q_s = 126 cfs @ El. 1356.8

$A_o = \pi(1.25')^2 = 4.9\ ft^2$ ✓

Determine C_o from Q_s = 126 cfs & Q_s = 23 cfs

$H_o = 1356.8 - 1351.4 = 5.4$

$$C_o = \frac{Q_s}{A_o\sqrt{2gH_o}} = \frac{126\ cfs - 23\ cfs}{4.9\sqrt{2(32.2)(5.4)}} = 1.13$$ ✓

$$Q_s = 1.13(4.9\ ft^2)\left(\sqrt{2(32.2)}\right)H_o^{0.5} + 23\ cfs = 44.43H_o^{0.5} + 23$$

$$Q_s = 44.43H_o^{0.5} + 23$$ ✓

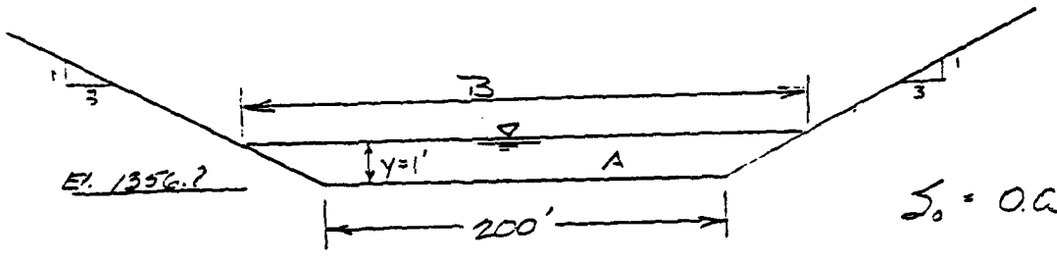
Elev.	H_o	Q_s	
1356.8	5.4	126	✓
1358.0	6.6	137	✓
1359.0	7.6	145	✓
1360.0	8.6	153	✓
1361.0	9.6	161	✓
1362.0	10.6	168	✓
1363.0	11.6	174	✓
1361.6	10.2	165	✓

Emergency Spillway

Ref: "Brater & King" Table 8-7 pg. 8-59

"Determining the Discharge Q of a Trapezoidal Channel when the Flow is at Critical Depth"

Check to see if flow passes through critical depth. Determine critical slope for a flow depth of $y = 1.0'$. If Spillway slope > critical slope, then flow is pass through the critical depth and Table 8-7 holds



$S_o = 0.030$ ft/ft

Critical depth flow $\frac{Q_c}{g} = \frac{A^3}{B} \Rightarrow Q_c = \sqrt{\frac{gA^3}{B}}$

For $y = 1.0'$

$A = 200'(1') + 2(\frac{1}{2} \times 3 \times 1') = 203\ ft^2$ ✓

$B = 200' + 2(3 \times 1') = 206\ ft$ ✓

$Q_c = \sqrt{\frac{32.2(203 ft^2)^3}{206}} = 1144\ cfs$ ✓

$$K = \frac{1.49}{n} AR^{2/3} = \frac{1.49}{0.03}(203.4^2)\left(\frac{203.4^2}{206.32}\right)^{2/3} = 9974 \checkmark$$

$n = 0.030$ for Earth, fairly uniform section w/ grass & some weed.

$$S_c = \left(\frac{Q_c}{K}\right)^2 = \left(\frac{1144}{9974}\right)^2 = 0.013 \checkmark$$

Spillway slope > critical slope
0.030 > 0.013 ∴ ✓

flow passes through the critical depth for $y = 1.0'$ and also for $y > 1.0'$. Use Table 8-7.

$Z = 3/1 = 3.0$
$b = 200$ ft

Elev.	H_m	H_m^Z/b	C_2	Q_E	
1356.7	0	0	0	0	
1358.0	1.2	.018	3.13	823	✓
1359.0	2.2	.033	3.15	2,056	✓
1360.0	3.2	.048	3.19	3,652	✓
1361.0	4.2	.063	3.21	5,526	✓
1362.0	5.2	.078	3.25	7,708	✓
1363.0	6.2	.093	5.27	10,096	✓
1361.6	4.8	.072	3.23	6794	✓

$$Q_E = C_2 b H_m^{1.5} \checkmark$$

DAVIS BROOK DAM

$A = RAREA RESERVOIR SURFACE AREA IN ACRES
$E = RELEV RESERVOIR ELEVATION IN FEET

REFF. U.S. DEPT. OF A.S.C.A. AS BUILT PLAN DWG. NY-2155-P

SCALE 1" = 200 ('½ REDUCTION SCALE 1" = 400')

Eq. $in^2 \times \frac{400 ft^2}{in^2} \times \frac{1 AC.}{43560 ft^2} = Ac.$

ELEV. 1337.7 = 4.1 Ac GIVEN DESIGN REPORT sh. 4

ELEV. 1345 = $2.40\ in^2 \times \frac{400 ft^2}{in^2} \times \frac{1 AC.}{43560 ft^2} = 8.82$ AC. ✓

ELEV. 1351.4 = 13.8 AC. GIVEN DESIGN REPORT sh. 4

ELEV. 1356.8 = 17.8 Ac. GIVEN DESIGN REPORT sh. 4

ELEV. 1358.9 = 20.0 Ac. GIVEN DESIGN REPORT sh. 4

ELEV. 1361.6 = 22.8 Ac. GIVEN DESIGN REPORT sh 4

ELEV. 1365 = $7.40\ in^2 \times \frac{400 ft^2}{in^2} \times \frac{1 AC.}{43560 ft^2} = 27.18$ AC. ✓

NOTE: The stage - storage from the SCS design report. was used.

Total Spillway Discharge ($Q_S + Q_E$)

Elev.	$Q_S + Q_E$	Reservoir Surface Area	
1337.7	0	4.1	✓
1345.0	—	8.8	✓
1351.4	23	13.8	✓
1356.8	126	17.8	✓
1358.0	960	—	
1358.9	—	20.0	✓
1359.0	2,201	—	
1360.0	3,805	—	
1361.0	5,687	—	
1361.6	6,959	22.8	✓
1362.0	7,876	—	
1363.0	10,270	—	
1365.0	—	27.2	✓

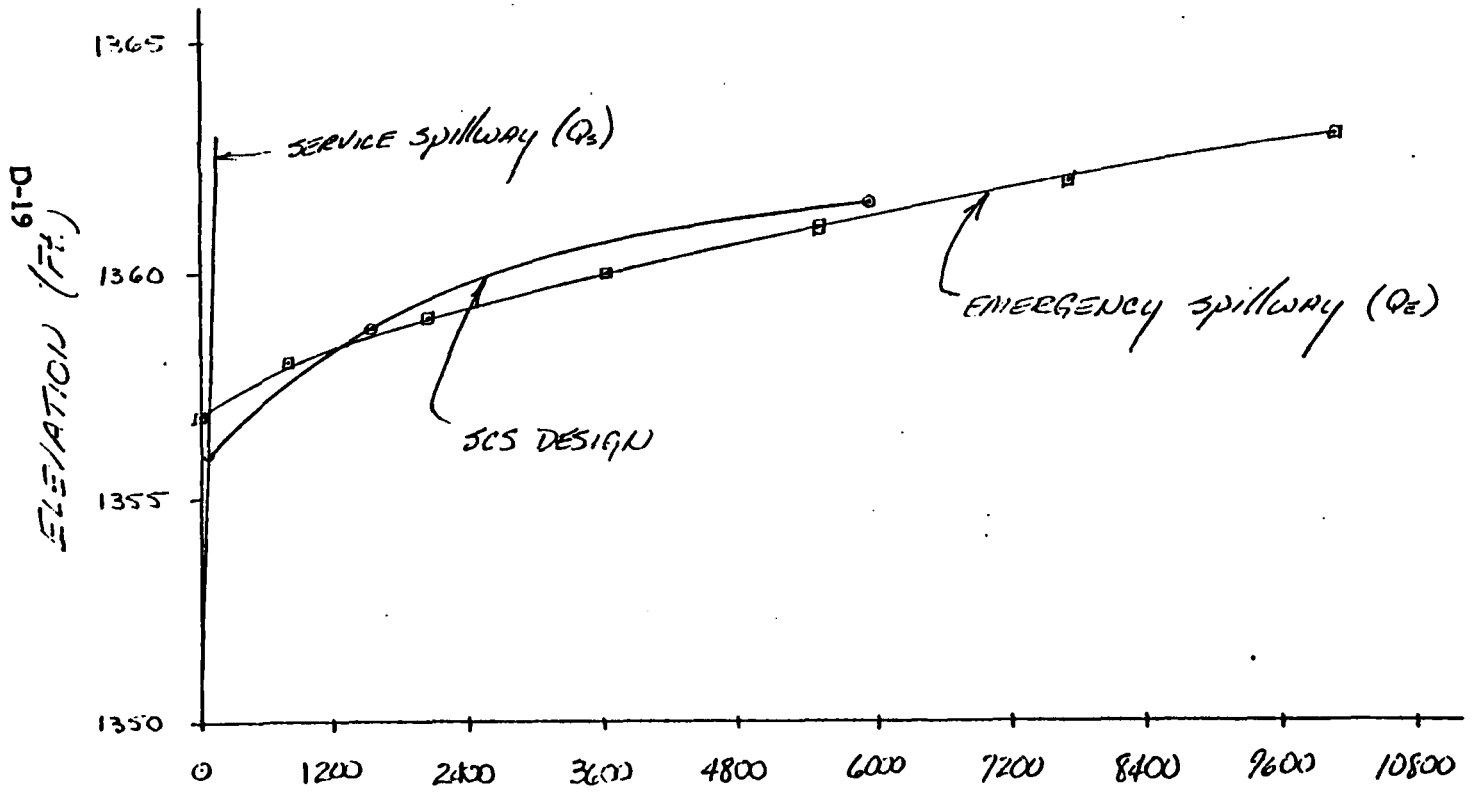
AD-A105 841 ERDMAN ANTHONY ASSOCIATES ROCHESTER NY F/G 13/13
NATIONAL DAM SAFETY PROGRAM. DAVIS BROOK DAM (SITE 1) (INVENTOR--ETC(U)
AUG 81 R J FARRELL DACW51-81-C-0017
UNCLASSIFIED NL

ERDMAN, ANTHONY, ASSOCIATES

DATE 5/4/81 SUBJECT Spillway Rating Curves SUB-SHEET NO. 6 OF 15

OWNER L.R. PROJECT NAME Dam 561 - Emergency Spillway Options

Spillway Rating Curve - Dam 561



Overtopping Data

Dam Height = 1361.6 ✓

Discharge Coefficient (C) = 2.7

Exponent (E) = 1.5

Length of Dam Crest = 564.6 ✓

Ungated Spillway Capacity @ Tilt Fixed (El. 1359.7)

	Elev.	Q	
Principal	1359.0	145	✓
	1360.0	153	✓
Emergency	1359.0	2,056	✓
	1360.0	3,652	✓

Principal Cap @ 1359.7

$\frac{1.0}{8} = \frac{0.7}{x}$ $x = 5.6$

Capacity = 145 + 5.6 = 150.6 cfs Say 151 cfs ✓

Emergency Cap. @ 1359.7

$\frac{1.0}{1596} \quad \frac{0.7}{x}$ $x = 1117.2$

Capacity = 2,056 + 1117.2 = 3173.2 Say 3,173 cfs ✓

Q_{Total} (from HEC 1) = 3254 cfs

$- Q_{principal}$ = 151 cfs

$Q_{emergency}$ = 3103 cfs ✓

Reservoir Surface Area @ Test Flood (El 1359.7)

Elev	SA
1358.9	20.0
1361.6	22.8

$$\frac{2.7}{2.8} = \frac{0.8}{x} \qquad x = 0.83$$

SA = 20.83 acres ✓

Emergency Spillway Capacities

Flood	Q_{TOTAL}	Elev.	Q_{ES}	A	V	Comments
PMF	3254	1359.66	3103	446	7.0	<8.0 no erosion
½PMF	1626	1358.54	1489	284	5.2	<8.0 no erosion

PMF

Assume $y_n/b < 0.02 \Rightarrow \therefore y_n = 0.789\left(\frac{Q n}{b S_o^{1/2}}\right)^{0.6}$ ✓

$y_n = 0.789\left(\frac{3103(0.06)}{200(0.03)^{1/2}}\right)^{0.6} = 2.16'$ ✓ $y_n/b = \frac{2.16}{200} = 0.01 < 0.02$ OK

$A = (2.16)(200) + 2\left(\frac{1}{2}(2.16)(3)(2.16)\right) = 446\ ft^2$ ✓

$V = \frac{Q}{A} = \frac{3103}{446} = 7.0\ ft/sec.$ ✓

½PMF

Elev	Q_E
1358	823
1359	2052

$Q_{1358.54} = 823\ cfs + .54(2052-823) = 1489\ cfs$ ✓

Assuming $y_n/b < 0.02$

$y_n = 0.789\left(\frac{1489(0.06)}{200(0.03)^{1/2}}\right)^{0.6} = 1.39'$ ✓ $y_n/b = 0.007 \leq 0.02$ OK

$A = (1.39')(200') + 2\left(\frac{1}{2}(1.39')(3)(1.39')\right) = 284\ ft^2$ ✓

$V = \frac{Q}{A} = \frac{1489}{284} = 5.2\ ft/sec.$ ✓

DAVIS BROOK DAM - STAGE VS STORAGE RELATIONSHIP

Elevation	Storage
1337.7	23.3
1351.4	85.8
1356.8	174.8
1358.9	213.5
1361.6	273.0

Ref: SCS design report

B.R. 4/13/81
9KA 4/13/81

DAVIS BROOK DAM

DAM DATA FROM AS BUILT PLAN

DAM TOP ELEV. 1361.7
DAM INV. 1316.2

1350	1320	1305	1298	1298	1305	1320	1350
0	400	742.5	752.5	772.5	7825	950	1025

REACH 1 LENGTH = 1600'

CROSS SECT.	1	2	3	4	5	6	7	8
	1350	1320	1300	1298	1298	1300	1320	1350
	0	400	750	760	765	775	950	1025

SLOPE: DAM INV − REACH 1 INV. = h ÷ L = SLOPE
1316.2 − 1298 = 63.2 ÷ 1600' = 0.0400

REACH 2 LENGTH = 1100'

1310	1300	1294	1287	1287	1294	1300	1310
0	100	582	597	617	632	700	890

CROSS SECT = 1310 / 0

1300	1290	1287	1287	1290	1300	1310
100	575	602	612	640	700	890

SLOPE: REACH 1 INV. − REACH 2 INV. = h ÷ L = SLOPE
1298 − 1287 = 11' ÷ 1100' = 0.010

REACH 3 LENGTH = 1700'

1275	1270	1269	1262	1262	1269	1270	1275
0	300	700	715	735	750	850	950

CROSS SECT.

1275	1270	1270	1262	1262	1270	1275
0	300	600	720	730	850	950

SLOPE: REACH 2 INV. − REACH 3 INV. = h ÷ L = SLOPE
1287 − 1262 = 25' ÷ 1700' = 0.015

REACH 4 LENGTH = 475'

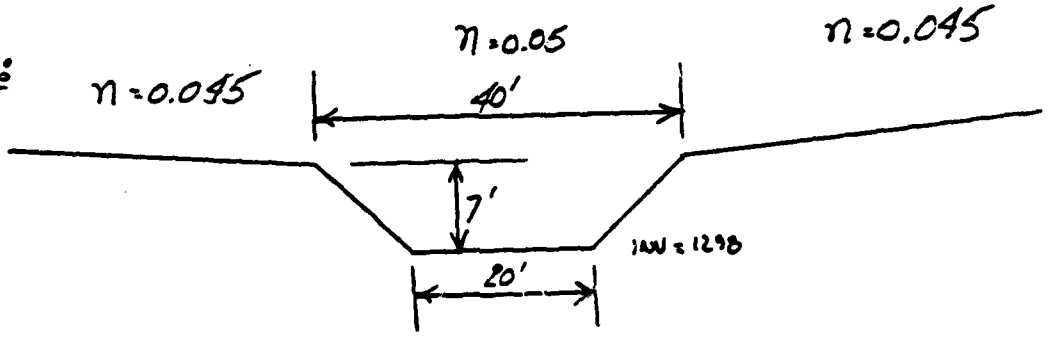
CROSS SECT.	1	2	3	4	5	6
	1270	1260	1255	1255	1260	1270
	0	200	225	235	265	300

SLOPE: REACH 3 INV. − REACH 4 INV. = h ÷ L = SLOPE
1262 − 1255 = 7' ÷ 475' = 0.015

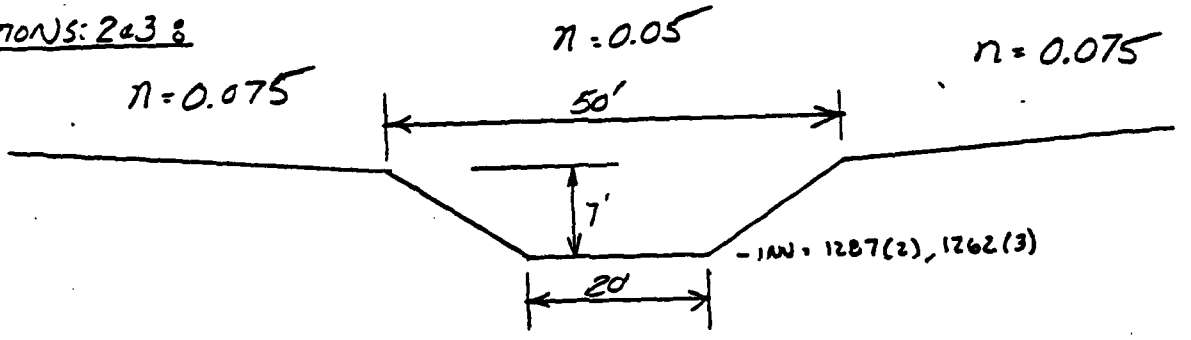
1270	1260	1255	1255	1260	1270
0	205	215	245	255	300

DAM 564 - CHANNEL SECTIONS

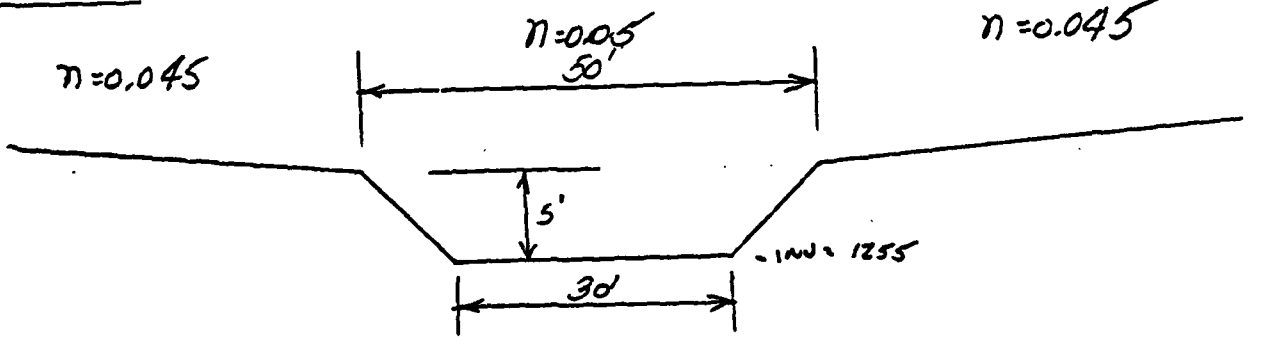
SECTION 1 :



SECTIONS: 2 & 3 :



SECTION 4 :



APPENDIX E

INFORMATION AS CONTAINED IN THE NATIONAL INVENTORY OF DAMS

INVENTORY OF DAMS

FORM 4474 ITEM	NOMENCLATURE	DATA
1	ID	NY00568
2	DIVISION	NAD
3	STATE	33
4	COUNTY	009 (CATTARAUGUS)
5	CONGR. DIST.	39
6	2ND STATE	
7	2ND COUNTY	
8	2ND CONGR	
9	OFF. DAM NAME	DAVIS BROOK DAM
10	LATITUDE	42-09.7
11	LONGITUDE	079-03.4
12	REPORT DATE	80/09/18.
13	POPULAR NAME	NONE
14	IMPOUND. NAME	UNKNOWN
15	REGION	05
16	BASIN	01
17	RIVER/STREAM	~~TR-CONEWANGO CREEK~~ DAVIS BROOK
18	D/S CITY-TOWN	NONE
19	DISTANCE	000
20	POPULATION	00000000
21	TYPE OF DAM	RE
22	YEAR COMPLETED	1969
23	PURPOSES	C
24	STR. HEIGHT	~~0043~~ 48
25	HYD. HEIGHT	~~0040~~ 43
26	MAX CAPACITY	00000~~210~~ 273
27	NORMAL CAP.	00000085
27A	CORPS DIST.	ORP
27B	OWNER CODE	N
27C	FED. REGULATED	N
27D	PVT. ON FED.	N
27E	SCS AID	T
27F	VERIFY DATE	80/09/25.

FORM 4474 ITEM	NOMENCLATURE	DATA
28	(SEE BELOW)	
29	D/S HAZARD	1
30	CREST LENGTH	00~~800~~ 794
31	SPILLWAY TYPE	11
32	SPILLWAY WIDTH	~~0250~~ 200 + 29 = 229
33	MAX DISCHARGE	000~~1512~~ 7000
34	VOLUME	0001~~40500~~ 61,361
35	POWER INSALLED	
36	POWER PROPOSED	
37	NO. OF LOCKS	0
38-45	LOCK LEN/WID	
46	OWNER NAME	R.L. SHIELDS
47	ENGINEERING	SCS
48	CONSTRUCTION	SCS
49	REG. DESIGN	DEC
50	REG. CONST	DEC
51	REG. OPER.	(DEC) SCS
52	REG. MAINT.	DEC
53	INSPECTOR	
54	INSP. DATE	
55	INSP. AUTH.	EN CON LAW SECT 15-0507
56	(SEE BELOW)	
57	INSP. INIT.	03 APR 81
58	UNSAFE	
59	URGENCY	
60	INSP. COMPL.	15 MAY 81
61	RPT. APPR.	
62	GOV. NOTIF.	
63	INSPECTOR	DC
64	GOV. RPT.	
65	DEFICIENCY	OP

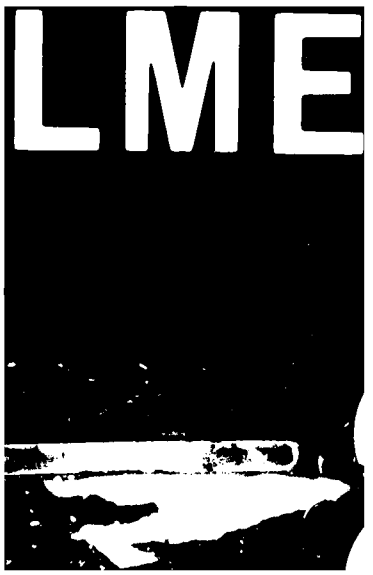
28 REMARK 1-10-88-3805 1820-UNKNOWN

56 REMARK ~~33-EMERGENCY NORMAL-19 DAM FILES TO BE YR-MFG~~
30- EMERGENCY SPILLWAY; PRINCIPAL SPILLWAY IS A 30 IN. CONDUIT WITH 7.5'x 2.5' RISER.

INSP. REMARK 33- TOTAL OF EMERGENCY AND PRINCIPAL SPILLWAYS

E-1

FORM 4474


LME